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—Excerpts from U. S. Coal Commission Report

Measurement in Vocational Selection (Concluded)
—Max Freyd

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Labor in the Bituminous Coal Industry

Excerpts from the Reports of the United States Coal Commission

The work of the United States Coal Commission and its investigators is a tour de force in industrial research. Within eleven months' time enormous masses of significant data were assembled by field investigators and statisticians. The solid, compact reports to Congress approximate 800,000 words in length. They contain fine examples of research method as well as valuable findings which should be read entire. Since this is for most readers out of the question, the following excerpts have been made from selected reports especially significant for personnel research.

SCOPE OF INVESTIGATION AND RECOMMENDATIONS

THE following selections from the report of the United States Coal Commission are almost exclusively from the investigations on the bituminous coal industry. This constitutes much the larger part of the coal industry. The studies made in the bituminous fields were carried out more exhaustively and over a longer period of time and the reports have more recently been released. Excerpts have been chosen to bring out salient features touching most closely problems of personnel.

It is not easy to make selections from such voluminous and condensed material. There is always danger of misinterpretation when the reader cannot have before him the complete statistical tables and other data. However, it is safer to become familiar with certain outstanding aspects of the Report than to permit opinions to be shaped by partisan comments of editorial writers and public speakers, some of whom, unfortunately, have committed themselves without having studied the reports in the original.

The Commission, as is well known, included John Hays Hammond, *Chairman*, Thomas R. Marshall, Clark Howell, George Otis Smith, Edward T. Devine, Charles P. Neill, and Edward E. Hunt, *Secretary*. They had the coöperation of many distinguished specialists and a large staff of field investigators, statisticians and engineers. Operators and labor organizations collaborated. Government bureaus such as the Census Bureau,

the Bureau of Mines, and the Geological Survey contributed both data and statistical aid. It has been estimated that the Report as a whole represents an investment on the part of government, owners, operators and miners of approximately one and a half million dollars.

The scope of the investigation as a whole is indicated by the following titles of special reports on the bituminous industry which have been released from time to time: Civil Liberties, Effect of Irregular Operation on the Unit Cost of Production, Labor Relations, Relief from Irregular Operation and Overdevelopment, Safety in Bituminous Coal Mining, Waste of Coal, Earnings, Wage Rates, Labor Turnover, Description of Mining Population, Costs of Living, Living Conditions, Engineering and Management, Wholesale and Retail Coal Trade, Storage and Fuel Economy, Purchase of Coal on Contracts, Cost of Production, and Investment and Profits in the Bituminous Industry.

Many of those portions of the Report which bear most directly on mining personnel problems were carried out under the general supervision of Joseph H. Willits, Willard E. Hotchkiss and Henry S. Dennison, who were immediately responsible for the investigation of labor relations. W. E. Fisher and Anna Bezanson, of the University of Pennsylvania, were directly responsible for the examination of wage rates and the study of earnings, respectively. Miss Marie L. Obenauer directed the study of living conditions and Miss Bertha Nienburg directed the study of cost of living in mining communities. The investigation of labor turnover in the bituminous industry was made by Delos Walker from the data collected primarily for the study of earnings.

CLASSIFICATION OF MINING OCCUPATIONS

Throughout the report there are used terms denoting occupational classes. To familiarize the reader with these terms, there are quoted here several paragraphs from the Commission's report on Wage Rates in the Bituminous Industry, together with a classification made by the Illinois Department of Mines and Minerals.

"The wage-earners employed at the bituminous coal mines are usually grouped into one of two classes; those whose working places are underground in the mine proper, generally called inside men, and those whose working places are on the surface, commonly referred to as outside men. In 1921 of the 663,754 wage-earners in the industry, about 85.5 per cent were inside men and 14.5 per cent worked on the surface. (The percentages relating to the number of men, unless otherwise specified have been based on the latest available statistics as compiled by the United States Geological Survey.)

"Of the employees working inside the mines in 1921, approximately 70 per cent were mining coal. In other words, seven out of every ten men employed inside the mine were doing the actual work of undercutting the coal with a pick or machine, drilling holes for powder charges, shooting the coal down and loading it into the mine cars. Three out of every ten employees were engaged

in the work of transporting the coal to the surface as maintenance of way men or in keeping the ventilating system in operation. Among the transportation men may be listed the motormen, the mule drivers, the cagers, the brakemen, etc. The maintenance of way men comprise such occupations as trackmen, timbermen, electricians, machinists, pipemen, etc. A small number of employees, including the bratticemen and door boys, regulate the current of incoming air so that it goes directly to the working places."

"The employees in the bituminous industry are further classified into tonnage and day men. By tonnage men are meant those workers who actually mine the coal, that is, who undercut it with a pick or machine, shoot it down and load it into the mine cars. As a rule these men are piece workers. In this group are included the pick miners, the machine cutters and their helpers, and the loaders. In general, the unit of payment is a ton of 2000 pounds. In many of the mines in Pennsylvania and Maryland a 2240 pound ton is used. Many of the non-union mines pay on a car basis. In some instances, especially in the case of machine cutters and their helpers a per day rate is paid.

"The remaining wage-earners are generally referred to as day men. Most of these workers are paid on a daily basis. In some instances hourly or monthly rates are paid. Out of 663,754 men and boys employed *in* or *around* bituminous mines in 1921, about 60 per cent were tonnage men. It is of interest to note that in the anthracite industry the percentage of men actually mining coal is only about 44 per cent. This difference is explained in part by the fact that anthracite coal mining, much more so than bituminous is a manufacturing as well as an extractive industry, and also because of the more complex systems of mining necessitated by the pitching seams, the depth of the mines, the presence of water and the general geological structure of the coal beds. The anthracite product commonly contains larger quantities of slate, rock and other impurities. As a result the coal is sent through an elaborate mechanical process, thus requiring a larger percentage of day men."

Although percentages for occupational classes vary considerably in different states, depending upon the kinds of mine openings, methods of mining, conditions of the coal, and other factors, the distribution of classes as shown in the 1921 Annual Coal Report of the Illinois Department of Mines and Minerals, will serve as representative of the industry as a whole. This study for the state of Illinois reports figures from which the following percentages were calculated:

(a) *Inside men.* Machine miners 37 per cent of the number of men underground, pick miners 27 per cent, drivers 5.5 per cent, trackmen and bratticemen 4 per cent, machine runners 4 per cent, motormen and assistants 3.5 per cent, machine helpers 3 per cent, timbermen 2.5 per cent, trappers 1.5 per cent, cagers, electricians and helpers, mine ex-

aminers, mine managers, pumpmen and pipemen, shot firers and runners, spraggers, and stablemen roughly 1 per cent each, and about 5 per cent unclassified.

(b) *Outside men.* Hoisting and other engineers 10.5 per cent of the number of men on the surface, blacksmiths and helpers 9 per cent, firemen 8 per cent, office employees at mine 7 per cent, carpenters 5.5 per cent, weighmen 4 per cent, machinists and helpers 3 per cent, top foremen 3 per cent, superintendents 2.5 per cent, watchmen 2 per cent, stablemen 1.5 per cent, and unclassified 44 per cent.

IMPORTANCE OF INVESTIGATION

"The United States Coal Commission, in rendering its final report, reiterates the premises stated in its earlier reports: The coal-mining industry is not only one of the largest in our country, but its uninterrupted service is essential to the well-being of the whole people; the condition of this key industry affects directly and in large measure the prosperity of all American industry; the large public interest in coal raises fundamental questions touching the relation of private right to public welfare; but underlying these questions in economics and law are the issues of peace in the industry and justice to the individual—issues that strike deep into the heart of American institutions."

NECESSITY FOR A BETTER UNDERSTANDING

"Food and water alone outrank coal among the necessaries of life. An uninterrupted supply of these three is a requirement of urban life as we know it today. Though anthracite ministers to health and comfort in several million homes, bituminous coal is the real foundation of that great industrial and transportation structure which enables more than a hundred million people to live in America and be so well supplied with all those things necessary for their health, comfort, and convenience, and bituminous coal also furnishes domestic fuel for two-thirds of the homes of the land. Therefore the mining of coal in 29 States, its interstate transportation, and its country-wide distribution together make up a service indispensable to the general public. Shut down its coal mines and the whole country would soon be not only cold but idle and hungry."

The distribution of the output of bituminous mines is as follows: 28 per cent goes to the railroads, 25 per cent to the boiler houses of factories and mills, 15 per cent to coke ovens and gas plants, 10 per cent to homes, 7 per cent to steel plants and the same percentage to power plants and street railways, 4 per cent to Canada or overseas, 2 per cent is used at the mines for power, and the remaining 2 per cent goes to the seaboard for steamship fuel.

"This dependence upon coal is not only country-wide but all-embracing: every man, woman, and child is the beneficiary of coal. So it is that absolute public necessity is back of the demand for continuous service from the coal mine and from every agency responsible for the transfer

of coal from mine to place of use. As the direct source of the energy that turns most of the wheels of an industrial nation, coal affects the community at large to a degree that is not generally realized until the continuity of this service is threatened. Twice within four years both transportation and industry have been threatened with partial paralysis due to wage disputes in the coal industry. The dependence of our whole industrial structure upon the continuous production of coal has been too obviously demonstrated by these two instances to leave room for any further debate on the relation of coal to the public interest."

"The first step toward protection of the public interest in the mining and marketing of coal as a continuous and efficient service is a better public understanding of the coal business. Guided by facts rather than rumors, by information rather than prejudice, the people will be able to exercise wisely the powers of the Government over this type of private business to which society has given a larger value and special opportunity."

"The extensive investigations by this Commission have necessarily put a heavy burden upon the industry. Yet in its response to these official inquiries, the coal industry has profited immeasurably in the better knowledge it has thus obtained of its own business. And this self-examination has not been limited to the inquiries initiated by the Commission, since supplementary investigations have been carried on by the coal associations, national and district, all of which have contributed to a truer understanding of the economic questions involved. If regarded not as arguments for or against any theory or system but as answers to current problems, as aids to suggested improvement in practice, and as the direct means of guiding the public in its relation to this great industry, this wealth of information will yield the best results.

SPECIFIC RECOMMENDATIONS

"The Government and the leaders of the coal industry both are blamable if the public has no proper conception of what coal means to the country, what conditions and handicaps have to be met in the mining and distribution of coal, what economies can be effected, what advance is needed and what can be done in bettering working and living conditions. On all of these subjects the public needs information and the industry needs publicity. Those in the industry who have expressed their purpose to take the American people into their confidence in the future by freely furnishing all the current information bearing on the relation of their business to the public interest surely can offer no objection to legislation providing specifically for that kind of publicity.

Publicity of accounts

"On the eve of the presentation of this report, the Bituminous Operators Special Committee appeared through its chairman, J. C. Brydon, and counsel, H. L. Stimson and G. H. Dorr, and submitted a plan for

the collection and publicity of accounts on a voluntary basis. This plan represents such a substantial and gratifying development of opinion within the industry that the Commission heartily commends it to the favorable consideration of the agencies of the Government through which it might be carried out. Pending the enactment by Congress of a law to provide for complete and compulsory publicity, this plan of voluntary reports would furnish much of the information required for the bituminous industry, and would thus bridge over the period between the close of the present Commission's investigation and the beginning of the permanent system of fact-finding and reporting recommended by it."

Use of Federal powers

"Both to protect the public and to promote the normal development of this great basic industry, the Commission recommends the use of the powers of the Federal Government over interstate commerce, recognizing that under our constitutional system a substantial part of the responsibility rests on the State and local governments and should remain there, and an even larger part on the industry itself and the public which it serves. The public includes investors in coal lands and properties, coal operators and miners, sales agents and retail dealers, as well as industrial and domestic consumers; and it is the aim of the Commission in view of the facts presented in its reports not only to protect the legitimate interests of the industry but to utilize to the fullest extent the good will and resources of the industry itself in putting to an end the disgraceful evils which have developed and which we have described."

"The Government can act only through administrative agencies, and it is clear that if anything is to be done at all commensurate with the gravity of the problem, an effective agency, with sufficient funds, experience and powers at its disposal, must be charged with the direct responsibility for such regulation and supervision as is necessary. Honest and efficient coal operators and dealers have nothing to fear from this. They have on the contrary reason to welcome it."

Coördinating agency

"The Commission is equally averse on the one hand to the unnecessary establishment of any new and unattached governmental agency and on the other to leaving this very necessary governmental responsibility to a haphazard collaboration of existing bureaus, whether in any one department, or in several departments. We believe that the logical and appropriate agency to exercise the necessary administrative and quasi-judicial functions required for the coal industry already exists in the Interstate Commerce Commission. We recommend the creation for this purpose of a special division in that Commission."

Permanent basis for fact-finding service by government bureaus

"Publicity as to the quality of coal in interstate commerce will

greatly deter unscrupulous operators and dealers from the sale of "fireless" and other adulterated coals.

"Publicity as to the costs and profits of the operators, transportation charges, the costs and profits of the wholesalers and retailers, will enable the consumer to judge whether a fair or an exorbitant price is being charged for his coal.

"Publicity as to the earnings, living conditions, and living costs of the miner will enable the public to form a judgment as to the equities of disputes between operators and miners over the renewal of wage agreements; and informed public opinion at such times will exert a deterrent influence upon the adoption of an unreasonable attitude by either or by both parties to the controversy and thus tend to prevent a lockout or a strike."

"There should be some organic relation between the Interstate Commerce Commission, in the exercise of its regulatory powers over the coal industry, and the . . . bureaus which already have experience and facilities for collecting any part of the information needed. The interstate Commerce Commission itself should, however, create any necessary facilities for continuing the collection of current information which does not more appropriately and naturally come from these existing sources.

"Fact finding and interpretation of the facts would thus, with mutual advantage, be separated to this extent from executive action based on the facts. The Geological Survey, for example, might continue to gather systematically, publish currently, and interpret the facts about production, reserves, storage, etc., and could furnish special information within its field when called upon by the Interstate Commerce Commission to do so. The Bureau of Mines might have the whole responsibility of safety investigations, and for any necessary Federal inspection of quality, etc. Investigation of labor disputes (not compulsory arbitration) might belong to any governmental agency which is charged with similar responsibilities in other industries."

Taxation of excess profits vs. government ownership

"The Commission realizes that the largest opportunity and the largest responsibility for putting the coal industry in order lies with the industry itself. Self-determination is the ideal.

"The coal industry, like other industries, but, with exceptional clearness, reveals two distinct and contrasting tendencies in management. There is one that is animated by a purely acquisitive and exploiting spirit, that has no other apparent end in view than to make money for the owners. Quick to make the most of any panic among buyers, of any opportunity to pyramid sales, to sell adulterated coal, or to cut the wages of miners, this type of operator and dealer resents public interference or public knowledge of his business. He is rightly called a profiteer and the public instinct which demands that he be exposed and curbed and ultimately forced out of business is sound. But besides profi-

teering, there is also in the coal industry, as in other industries which exploit natural resources or other differential advantages, a less conspicuous but equally unjustifiable element in the cost to the consumer.

"A substantial part of the amount paid in royalties and in excess profits represents a return to owners of wealth who perform therefore no useful social service and who take no part in production. This form of ownership does not increase efficiency or economy or conservation. It does not contribute to the mining of coal or to making it cheaper. There is no way in which this first deduction from the value of the product can be forcibly prevented, as far as this Commission is aware, except through government ownership, which we believe to be both undesirable and impracticable, or by taxation on the excess profits and royalties, which we recommend, although with no expectation that it will be completely effective as a remedy. Not through governmental coercion but through the enlightened self-interest of producers and consumers, the real remedy is to be sought. The coal industry can reform itself from within.

"Management for effective service to the public, rather than exclusively for profit, is the second of the tendencies mentioned and the Commission is convinced that this tendency is clearly in the ascendant; that operators are increasingly coming to realize their duty as citizens and their enlightened self-interest in establishing such a spirit of coöperation as will promote the prosperity of the industry with direct benefit to the public."

Need for action by the consumer

"The immediate cause of high and exorbitant prices of soft coal is a demand from buyers far in excess of the supply. There is no evidence of any combination or monopoly among producers and shippers of bituminous coal, now or at any time, sufficient to control production or prices. As has been repeatedly shown in these reports, the peak demand for coal involves a peak demand for coal transportation too acute to be adequately met by the railroads, except by an unwarranted expansion of rail equipment and facilities. The removal of the peak therefore appears to be the direct remedy, and the consumer can contribute to the removal of the ups and downs of the coal business by buying for regular delivery and balancing seasonal variations in consumption by storage.

"Another way open to the consumer in aid of more regular mine operation and steadier market is the purchase of coal on contract. In this, producer and consumer can coöperate, and the unusual shifting about by producers for markets and by consumers for tonnage in the past six years has been both effect and cause: the effect of war and strike conditions and the cause of further disturbance of the coal trade. To aid in stabilization, however, the tonnage contract for coal must be more than an option. Coal shippers and coal consumers must become impressed with the idea that a contract means a fixed obligation with respect to both delivery and acceptance of tonnage and that no shipper

with contract commitments should enter the spot market until he has fully discharged his contract obligations, or buyer shut off contract shipments while he purchases lower priced spot coal.

"Better utilization of coal by the consumer is a field not investigated by this Commission. No report on the coal industry would be complete, however, without reference to the saving in cost of energy and heat that can be effected by more general appreciation on the part of the consumer of the losses and waste for which he is responsible.

"Plainly no one can logically complain of wasteful production of coal when his own consumption of coal is even more wasteful. Nor can the consumer justly complain of high prices for coal when he throws away so large a part of the heat units in the coal he buys. Thrift in the use of coal is especially to be commended to the larger consumers, and fortunately it is at the steel plants, by-product coke plants, and central power stations that the best practice prevails. Last year the electric power stations of the country generated from coal 25 per cent more kilowatt hours than in 1919, but in doing this burned nearly a million tons less coal—that is fuel economy on a national scale. The super-power project which plans the installation of only the largest power plants would effect even greater savings in the consumption of coal as well as in the transmission of electricity."

In addition to the recommendations just outlined, the Commission reported in its *Study on the Anthracite Industry* the following important recommendations which bear directly on problems of personnel.

Hours

The agreement governs the number of hours worked per day. "The length of the working day has been gradually reduced until now the eight-hour day is the prevailing day for the industry. There are still, however, a few occupations in which in most mines the normal working day is longer; nine, ten and twelve hours. The occupations are not the same in all the mines, but in general include the following: air compressors, stable bosses, night firemen on locomotives and steam shovels, pump men on breakers, pump runners, fan runners, watchmen on breakers, puddlers, bottom washmen and wash house men. The Commission's study of wage rates indicates that in 148 collieries about 2 per cent of the employees in 55 specified occupations in the anthracite industry work in excess of eight hours per day and that about 70 per cent of these 2 per cent work on a twelve-hour basis. Some of the occupations are not burdensome and do not involve an amount of strain that is at all comparable with eight hours' work in the mines. However, active and continuous complaints come from the men who are working more than eight hours a day, and it is certain that as long as the day in excess of eight hours exists it will continue to be a source of irritation and unrest, when the basic day for the industry is eight hours."

"In the face of the principle of the eight-hour day properly accepted in successive agreements since 1916, there can be no justification for the employment of a considerable number of men on shifts of twelve hours or more."

Labor commissioners

The Commission recommends the appointment in each company of a labor commissioner with full authority to adjust disputes without delay. He is the link that makes possible in many instances conciliation between the men and the company without carrying the dispute further. In companies where one executive has been designated to spend full time on labor relations, advantages such as these have ensued:

1. All problems, large and small, are discussed with him by the employees. This is possible only through an actual visit by the executive to the colliery, and thus insures more accurate information regarding colliery conditions on the part of the management.
2. Delay in adjustment is reduced to a minimum.
3. Improvement in labor relations which usually results from a higher executive's visit to a colliery is made more or less permanent.
4. Foremen and superintendents receive expert systematic instruction from him on labor relations.
5. Demand for wise dealing with the increasing pressure exerted by the union is adequately met.

Alternates for members of Conciliation Board

"In view of the delays that have been caused by the absence of members of the Conciliation Board, alternates of like standing in the industry should be selected with authority to act in the absence of the original member."

Continuing umpire

"The Commission recommends that in the next agreement there should be a provision for a continuing umpire and that he or an assistant named by him should sit with the Conciliation Board at all its meetings, but without a vote."

Examiners

"If the Board of Conciliation does not clearly understand the facts involved in any case, it should appoint an examiner from each side immediately to investigate and furnish it with all the facts."

Operators' representative

"The operators' group should appoint a full-time representative and all necessary assistants to consider jointly at the mine with the district officers of the union each case before it is appealed to the Conciliation Board in the hope of securing a local agreement, arriving at a better understanding by each side of the difficulties and problems of the other, and thus producing a mutual feeling or respect for the other's opinions and each obtaining the outlook of the other upon the problems."

Breach of agreement

"The agreement should provide for penalties for the breach thereof by either party, and the method by which such penalties are to be enforced."

Joint Committee on Industrial Code

"So many changes have taken place since 1903 that the agreement should provide for a joint committee to work out a restatement of the whole agreement in the terms of today, and this agreement should be specific enough to be the code by which all persons having anything to do with the settlement of grievances shall be bound."

Job analysis

"The renewed agreements have too rigidly retained the practices and conditions of 1902 and have not had adequate flexibility. An industry which is necessarily constantly changing cannot tie itself inflexibly to conditions of twenty years ago without hampering the management and working injustice to miners. A second joint committee should be provided for in the next agreement and directed to make an engineering study of the elements of the job of mining anthracite coal, for the purpose of building up a scientific and more equitable basis for rate making. Until, however, such committee shall disclose fundamental facts which shall form a decidedly better basis, the old 1903 base should, of course, be retained, for however inequitable the basis of 1903 with its subsequent modifications, it is better than no basis at all."

Assimilation of aliens

"Persons, firms and corporations, doing business under the protection of the laws of this land, owe it to be diligent in their efforts to educate and naturalize the aliens whom they employ and for whose presence here they have been in too many cases responsible. It appears that less than one-half of the 78,000 foreign born miners have sought citizenship, notwithstanding 68,000 of them have been in this country over ten years. A rebirth of the American idea is needed in the anthracite region, and great care should be exercised to differentiate on questions which may lead to a strike as to whether they are economic or political in their nature. The alien should be permitted to exercise every economic right of an American citizen, but no political right until through naturalization he assumes allegiance to this country."

BITUMINOUS MINE WORKERS

COMPOSITION OF POPULATION: LIVING CONDITIONS: COST OF LIVING

"Coal mining, obviously, must be done where there is coal in the ground. Considerations of the available supply of labor and accessibility to a market may determine when a mine shall be opened, but if opened, the work must be done on the spot; and when the coal in that spot has been mined, work there comes to an end and the workers must go elsewhere.

"From this axiom it follows (1) that the natural surroundings of the mine-workers' homes vary as widely as the location of the coal deposits;

(2) that frequently these mine-workers must live far from any normal center of population; and (3) that to a great extent—greater probably than in any other occupation in the United States—they are dependent on their employers, not only for the conditions under which they work, but also for the character of the houses in which they live and for the resources and atmosphere of the community of which they are a part. In respect to physical comfort, educational advantages, protection of health, the mine-worker's family in a company town may be better off or worse off than the average workman's family in town or city; but whether better or worse, the coal mine operator is chiefly responsible, for there is relatively little the mine-worker and his family can do to improve conditions.

"The 600,000 bituminous coal mine workers are scattered over 28 States, but 70 per cent of the entire number are in a 900-mile strip running from northern Pennsylvania, through Ohio, West Virginia, Maryland, Virginia, eastern Kentucky, and Tennessee, to central Alabama; 20 per cent are in two areas lying in Indiana, Illinois, Iowa, Missouri, Oklahoma, and Kansas; and of the remaining 10 per cent, the great majority are in the Rocky Mountain region and on the Pacific Coast. In Pennsylvania and the Middle West the coal miners live for the most part in or close to established communities, in the midst of a country that had been well settled and cultivated before mining operations were begun. In the southern Appalachian areas, on the other hand, and in the western and the far western states, the miners' homes are frequently tucked away in narrow gorges or creek beds, up steep mountain sides, along ridges, or dropped here and there on the western plains and plateaus—in places where no white man has ever lived before. Many of the places are at a considerable distance from any town or city. Many are of great scenic beauty—ideal sites for the solitary camper or a summer hotel, even if not for a manufacturing plant or a town.

"Four distinct but complementary studies have been made by the Commission to secure information about living conditions:

(1) For data on physical environment and community resources, a staff of field agents made "surveys" of 880 communities—713 controlled by companies, 167 independents.

(2) For the characteristics of the mining population (the human requirements to be met by these communities), a tabulation has been made from the schedules collected by the Bureau of the Census in 1920 and put at the disposal of the Commission for this purpose.

(3) At the instance of the Commission, "sanitary surveys" were made by the United States Public Health Service in 123 communities 64 of them company-controlled, 59 independents—so chosen as to represent a wide range of sanitary conditions.

(4) For information about the cost of living—how much the miners' families have to spend and what they can get for it—retail prices, rental

rates, etc., were studied in selected districts, and family budgets were collected."

COMPOSITION OF THE POPULATION

"To the data collected by the United States Bureau of the Census in the course of its regular decennial enumeration of the population in 1920, the Commission turned, with the consent and coöperation of the Director of the Census Bureau, for descriptive facts about the bituminous mine workers, as it had done for the corresponding facts about the anthracite mine workers. In the case of anthracite, the Commission had the population of Pennsylvania carefully searched for all mine workers. As practically all the anthracite deposits of the country are in this state, this process gave practically 100 per cent of the anthracite mine workers. The same policy was followed in Pennsylvania and West Virginia, the two leading states in the production of bituminous coal, and in a number of other states of importance. Resources at the disposal of the Commission did not permit doing this in every coal field, but not far from nine-tenths of all the mine workers reported by the 1920 Census are included in the data compiled for the Commission for the purposes of this report. In addition to those classed as "coal operatives" by the Census, auxiliary labor is included among the mine workers in this report. Therefore, in states like Pennsylvania and West Virginia, where the policy of searching out all mine workers prevailed, the number of "mine workers" in our tables exceeds the number of "coal operatives" reported by the Census. Auxiliary labor constitutes for the country as a whole, approximately 4 per cent of the mine workers though the porportion varies in the several states, owing to variations in mining conditions and mining practice."

Distribution of workers

"The Census classifies dwellers in incorporated communities of 2,500 population or over as *urban*, all others as *rural*. Only 21 per cent of the bituminous workers tabulated come under the classification of *urban* leaving 79 per cent as *rural*. . . . . The percentages for individual states vary considerably from these nation-wide averages. Taking the five principal States of those tabulated separately for this report, the proportion living in urban communities runs up to 47 per cent in Illinois, and in Indiana to 40 per cent; while in Pennsylvania and Ohio it drops to 18 per cent, and in West Virginia to less than 7 per cent of the total number of mine workers in the state. . . . In the anthracite field 70 per cent of the mine workers live in incorporated communities of 2,500 or over, as against 21 per cent of bituminous workers living in such communities; or conversely, only 30 per cent of the anthracite workers are classified as rural dwellers, as against 79 per cent of bituminous workers.

"These contrasts between the anthracite and the bituminous fields as well as between the different bituminous states have significance in connection with certain of the causes that have given rise to controversy, friction, and even violence in

the coal industry. Abuses growing out of company stores, out of company houses, out of company-controlled communities, and "closed communities" with an accompanying restriction or suppression of civic rights are now practically unknown in the anthracite fields, since less than ten per cent of the anthracite workers live in company houses, less than ten per cent in company controlled communities, and a very few of these communities are more than a few miles from incorporated towns, with easy transportation connections. Approximately 90 per cent of the anthracite workers reside in communities that are independent of coal operator control and they accordingly "live just as the mass of other Americans live," in free self-governing communities where their civic rights are within their own keeping. Similarly these types of grievances and disturbances from which the anthracite field is practically free are found infrequently, if at all, in those bituminous states where, as in Indiana and Illinois, nearly one-half of the mine workers are able to live in free, incorporated communities; and they are found with more frequency and in an intensified form in places where, as in West Virginia, only a small part of the mine workers are able to live in such communities."

Age

Two-thirds of all the bituminous workers are between 20 and 45 years of age, and 7 per cent are over 55 years. This distribution holds roughly for the principal states studied.

Nationality and citizenship

Nearly 60 per cent of the bituminous workers are native-born white. About 8 per cent are native-born colored, and about 32 per cent were born in foreign countries. The percentages for the individual states show wide variations from these nation-wide averages. Pennsylvania has 30 per cent of all the bituminous workers in the country, and over half of these are foreign born, as compared with Indiana's one foreign-born miner out of six.

"The foreign-born formed in 1920 only 3.6 per cent of the mine workers in Alabama who were tabulated, and 20 per cent of those in West Virginia; but 52.7 per cent of the miners of Alabama and 19.9 per cent of the miners of West Virginia in 1920 were colored. In none of the other leading bituminous states studied, Pennsylvania, Ohio, Indiana, and Illinois —did the number of colored mine workers go as high as 2.5 per cent. As the colored mine worker and the immigrant mine worker alike are more easily exploited for a low wage their relative importance in the mining population has a bearing in considering various questions. The native white predominate in West Virginia, Indiana, Ohio, Illinois and other middle western states, and, also in the Rocky Mountain regions and the far West, although Mexicans are numerous in New Mexico, and Japanese in the Northwest.

"A comparison of the bituminous and the anthracite fields shows approximately 53 per cent to be foreign-born in the anthracite, as against 33 per cent, in the bituminous

field; in other words, one out of three bituminous workers and one out of two anthracite workers was born outside the United States.

"Of the total of 171,990 foreign-born bituminous workers, the approximate percentages furnished by the principal countries were as follows:

	per cent		*per cent*
Italy	22	Hungary	8
Austria	14	Slovakia	8
Poland	13	Jugo-Slavia	5
British Isles	10	Germany	3
Russia	8		

"From these nine countries have come 93 per cent of the foreign-born bituminous workers, the remaining 7 per cent coming from France, Bohemia, Sweden, Belgium, Greece, Bulgaria, Roumania, and Syria. The relative numbers from the several over-seas countries represented vary in different bituminous states. While the Italians form 22 per cent of all foreign-born mine workers, and those from the British Isles only 10 per cent, in Indiana the workers of British birth form 35 per cent of the foreign-born mine workers and the Italians only 19 per cent. In West Virginia the Italians outnumber all other foreign-born groups, except the Hungarians, by more than two to one.

"The proportion from the various countries differs markedly also in the bituminous and in the anthracite fields. For example, 22 per cent of the foreign-born bituminous workers are Italians, but only 12 per cent are of this group in the anthracite field; Poland and Russia together furnished 21 per cent of the foreign-born in the bituminous fields, but over half in the anthracite fields.

"Sixty-nine per cent of the foreign-born bituminous mine workers have been in this country ten years or more. The corresponding figure for the anthracite field is 78.4 per cent. The bituminous fields, therefore, have somewhat more of the recent immigration than the anthracite. There are interesting variations also among the several states. In West Virginia, for example only 55 per cent of the foreign-born have been in the United States ten years or more, as compared with 75 per cent in Illinois and in Indiana.

"The negligible percentage who had been in the country less than five years reflects the almost complete cessation of immigration that took place with the out-break of the war and continued up to 1920. An analysis indicates that in general during the three five-year periods up to 1915 there was a steady and somewhat uniform flow of immigrants into the bituminous mines, but that this was not true in all the individual states. Pennsylvania received immigrants in her bituminous field in almost the same proportion as the country as a whole in each of these three five-year periods, and Ohio showed only a moderate variation. But both Illinois and Indiana showed a perceptible change in the period 1910-1915 as compared with the preceding five years, the percentage of those arriving between 1910 and 1915 in Indiana being only 15.75 as against 25 per cent arriving between 1905 and 1910, while in Illinois the percentage dropped from

23 per cent to 15.5 per cent. In West Virginia a contrary record is shown. Less than 11 per cent of its foreign-born bituminous miners arrived here prior to 1900; 16 per cent of them arrived between 1900 and 1905; 28 per cent between 1905 and 1910; and 35.5 per cent between 1910 and 1915. In other words, in the period 1910–1915 there had been some falling off in the stream of immigration into the coal fields of Ohio, a more marked falling off into both Indiana and Illinois, a slight increase into Pennsylvania, and a marked increase into West Virginia, just as there had been in the five-year period preceding. Even when there was an almost complete cessation of the stream of immigration, between 1915 and 1920, West Virginia continued to receive more than a proportionate share of the immigrants going into the bituminous fields.

"The facts about length of residence in the United States take on an added interest in connection with the percentage of foreign-born who have been naturalized. Only 26.2 per cent had completed their naturalization by 1920; first papers had been taken out by 16.9 per cent; while 51.7 per cent were reported as still wholly alien. The status of 5.2 per cent was not reported. As first papers can not be taken out by anyone under 18 an allowance must be made for the number of foreign-born mine workers under that age; but a careful consideration of the available data on the subject supports the conclusion that this could not reduce the proportion of the foreign-born workers over 18 who have remained entirely alien to less than 50 per cent.

"In view of the fact that less than 1.5 per cent of them had been in this country less than five years, a percentage of aliens as high as 50 suggests an unhealthy condition in the matter of the Americanization and the assimilation of immigrant workers in the bituminous coal fields. Of the foreign-born anthracite workers 44.1 per cent were found to be wholly alien in 1920; and in reporting this fact the Commission took occasion to suggest that so high a percentage of aliens appeared to reflect an unfortunate lack of interest or of energy on the part of the interests or the associations that might properly be expected to stimulate the foreign-born to assume the privileges and duties of American citizenship. That comment applies with still more force in the case of the bituminous fields.

"The percentage who had taken no steps toward naturalization varies widely in the principal bituminous states. In Indiana it was only 28.1 per cent, in Illinois 31.2 per cent, and in Ohio 33.9 per cent; while in Pennsylvania it runs up to 59.7 per cent, and in West Virginia to 74.8 per cent. In this last named state, with its larger proportion of more recent immigrants, less than ten per cent in 1920 had been naturalized."

Literacy

"Of the total 525,152 bituminous mine workers tabulated, 87.9 per cent were reported as able to read and write, 1 per cent as able to read but

not to write, and 11.1 per cent as unable to read or write. Of the native-born, 92.8 could read and write; 0.8 per cent could read but not write; and 6.4 per cent could neither read nor write. The 17,318 born in the British Isles made a better showing than our own native Americans; 96.5 per cent could read and write; 0.6 per cent could read but not write, and only 2.9 per cent could neither read nor write. Of the 154,672 foreign-born from countries other than the British Isles only 75.5 per cent could read and write; 1.7 per cent could read but not write; 22.8 per cent could neither read nor write; and 12.7 per cent were reported as unable to speak English.

"These percentages varied considerably in the principal states. In Indiana 12.1 per cent of those born outside the United States and the British Isles were unable to read or write; in Illinois, 17.1 per cent; in Ohio 18.5 per cent; in Pennsylvania, 24.7 per cent; and in West Virginia, 28.7 per cent; while the percentages unable to speak English were respectively 8.1, 8.7, 15.0, 24.7, and 17.4. Inasmuch as 98.7 per cent of the foreign-born mine workers had been in this country five years or more, the number unable to speak English appears comparatively large. Both ability to speak English and ability to read and write are of particular significance in an industry of a hazardous nature, where, on occasion, life or death—and frequently safety from lesser dangers—may depend on understanding posted notices or on the spoken warning of the foreman; or on the mine-workers' own ability to leave written warnings for others.

Domicile and marital status

"Approximately 62 per cent of the bituminous coal mine workers of the United States, whether native white, native colored or foreign-born, maintain homes where they work, and over 95 per cent of all those maintaining homes are, or have been, married men. Over 17 per cent more, chiefly single men, are living with parents or relatives, and 20 per cent, largely single men, but many married men whose wives are not with them, are boarding or lodging.

"In 70 per cent of the homes of the mine workers throughout the bituminous coal fields, taken as one group, there are not over five members in the family, including in the term the parents—or those standing in the place of parents—and the children living at home. In approximately 11 per cent are there eight or more members. These totals, however, obscure marked differences: 85 per cent of the families of the colored mine workers have not more than five members, 73 per cent of the native white families, 61 per cent of the foreign-born; while on the other hand, 15 per cent of the foreign-born families number eight or more, 9 per cent of the native white, and less than 6 per cent of the colored."

"In 69 per cent of the homes the mine worker is the sole breadwinner; in 23 per cent there is one other member of the family who is working for money; and in only 8 per cent

are there two or more. Deducting the 4 per cent who are keeping house for themselves alone, the proportion maintaining homes who are the sole breadwinners is approximately 65 per cent."

GENERAL LIVING CONDITIONS

"For information about the kind of homes which the bituminous mine workers have, surveys of living conditions were made by field agents of the Commission in 880 communities in which about 200,000 mine workers live, situated in Alabama, Illinois, Indiana, Iowa, Kansas, Kentucky, Maryland, Missouri, Ohio, Pennsylvania, Tennessee, Virginia, and West Virginia. Of the 880 communities, 713 were controlled by companies, and 167 were independent. A detailed schedule was used, covering fully such points as topography and natural location, housing and highways; water supply, sewage disposal, and lighting service; sources of food supply; means of intercourse and communication with other communities; educational facilities; churches, hospitals, medical service, recreation, and other community resources."

Types of communities

"When mining operations follow the coal seams into places remote from centers of population, operators are obliged to provide living quarters not only for the mine workers but also in the majority of cases for their families as well. The necessity for such provision increases with the distance from, and diminishes with accessibility to, self-controlled centers of population. It is only in sections which have a large proportion of foreign-born that relatively large numbers of mine workers are found living in company communities when normal communities are within a practicable distance. Approximately half of the bituminous coal mine workers are housed in company dwellings, but this is far from uniform throughout the several coal regions. Three distinct aspects are found in this respect in the coal fields, where 90 per cent of the bituminous mine workers live."

"On the whole, company-controlled communities are relatively unimportant factors in the middle west, where four-fifths to nine-tenths of the mine workers live in self-governing communities; they are highly important to the mine workers of West Virginia and the other southern fields, where from two-thirds to four-fifths depend upon the companies for housing—usually because they must. The company-controlled communities are important, though in less degree, to the bituminous mine labor of Pennsylvania and eastern Ohio, where from a fourth to half of the workers live in company communities, even though self-governing communities are not always remote."

"The predominance of company-controlled communities included in the field survey (713 out of the total 880) was due to two considerations: (1) the variations in natural and acquired environment are much greater among them than among towns which have grown in particular places largely because those places were suitable for town sites; and (2) the conditions

in self-governing communities are dependent on economic circumstances and the degree of civic progress, rather than upon the attitude and policy of a coal company."

Rating scheme

Difficulties of natural location frequently confront operators who must build towns in precipitous country. Sometimes they are overcome; more frequently they are allowed to dominate. . . . . After information about living conditions in 449 company-controlled communities in the bituminous coal fields of Pennsylvania, West Virginia, and Ohio had been gathered on detailed schedules a rating schedule was devised, based on this fund of information, and was used in the investigation of 264 additional company-controlled communities. These 264 were selected in thirteen states, every effort being made to get a fair representation of conditions. In each state the original lists were submitted to secretaries of the operators' associations and of the United Mine Workers. They were asked whether the communities selected represented in the correct proportions the best, the average, and the poorest camps, and any necessary changes were made.

"The rating device was analogous to that used by the United States Public Health Service for its sanitary surveys, but it took into consideration factors which determine conditions of living, instead of those pertaining to health and sanitation. The use of this process made it possible to extend the study over a larger field at relatively less cost; and it also gave a basis for measuring the general character of the communities in comparison with one another.

"In order to measure by the same standard some of the 449 communities which had been studied earlier, the scoring method was applied to 100 of the detailed schedules which had been gathered, this scoring being done by the same agents who had been using the scoring system in the field. As resources did not permit doing this on all the 449 schedules, the 100 were chosen to include those which could be identified by inspection as indubitably belonging to the upper or in the lower ranges of the scale of conditions."

"In order to distinguish between the factors for which the coal companies are more or less responsible and those beyond their control, the ratings of natural location and of camp conditions were kept separate, each on a basis of a possible 100 points and no attempt was made to determine the relative weight which each might appropriately receive in a combined rating which would include both.

"There were 66 among the 364 communities which came out by this process with a rating of 75 or over on community conditions, and 82 which had a rating of less than 50. Detailed lists give the names and locations of communities, together with the names of the companies owning the supporting mines at the time of this investigation."

"The 66 which were rated above 75, however, are enough to show not only that satisfactory living condi-

tions are possible in a mining town, but that they are practicable even in the most difficult natural locations."

"The scoring process is an effective means for correcting the natural tendency to give undue weight to fresh paint and general appearance at the expense of other factors equally or more important but not so obvious. A flimsily built, poorly equipped row of houses which is freshly painted and free of trash and clutter is measurably better than a flimsily built, poorly equipped row of dingy houses on cluttered premises; but it is not better than a substantially built, well-equipped row of houses, even if the well-built houses need paint and their surroundings are untidy and unattractive. This is not to belittle the importance of paint and orderliness, but only to point out that by the scoring method these factors receive due, but not undue, consideration."

Housing and other facilities.

"The observations of the field investigators suggest that the difference between satisfactory and unsatisfactory living conditions lies not so much in the type of house . . . as in the care and judgment used in selecting the site for the community, in preparing the site, in the arrangement of the community buildings and common areas, and in the upkeep of the project as a whole.

"The data on modern conveniences and sanitary equipment may be summarized as follows: Of the approximately 71,000 company-owned family dwellings included in the survey, 2.4 per cent had bath tubs or showers; 3 per cent had inside flush toilets; 13.8 per cent had running water, though nearly 61 per cent of the communities had water works systems; 66.3 per cent had electricity or gas (nearly all electricity)."

"Wells, driven or dug, are the prevailing source of water supply, in spite of the fact that 61 per cent of the communities have water works systems. The wells are usually, though not always, equipped with pumps; and these, as well as the hydrants, which also are used in many communities, are so placed in the best communities relying upon such methods of water supply that there is one pump or hydrant for each family. In rare instances a family had both a hydrant and a pump. In over 67 per cent of the communities, however, one pump or hydrant or other supply point is used by from two to six families; and in half a dozen communities, as many as thirty families had to get their water from one well or hydrant."

"Repair and general up-keep are as important in determining the character of a community as are plan, construction, and equipment. The repair of company houses appeared to be a subject of constant controversy between individual mine workers and mine officials. Tenants contended almost uniformly that it was a difficult matter to get defects and dilapidations corrected by the companies without repeated complaints and insistent demands. On the other hand, there was general complaint by company officials that the tenants wilfully or carelessly destroyed company property."

"In the worst of the company-controlled communities the state of disrepair at times runs beyond the power of verbal description or even of photographic illustration, since neither words nor pictures can portray the atmosphere of abandoned dejection or reproduce the smells. Old, unpainted board and batten houses—batten going or gone and boards fast following, roofs broken, porches staggering, steps sagging, a riot of rubbish, and a medley of odors—such are features of the worst camps. They are not by any means in the majority; but wherever they exist they are a reproach to the industry and a serious matter for such mine workers and mine workers' families as are dependent upon the companies for living facilities."

"Among other community resources which are important factors in living conditions are educational facilities, provisions for medical and dental service, institutions of public worship, and means of recreation and amusement. The most conspicuous facts about resources in the company communities themselves may here be summarized as follows:

In the majority of the communities, provision for recreation and amusement is so meagre as to be almost negligible.

Educational facilities were rated at 75 or over in 44 per cent of the communities which were scored in the field on the basis of 100. These facilities were not always provided by state or county boards of education, but sometimes were subsidized by the companies, and sometimes supported by a school tax deducted from the pay of the mine workers.

Medical service was within reach of practically all the communities, but with varying degrees of ease. One physician sometimes serves several communities and is therefore not able to respond to calls promptly. Dental service was within practicable reach of only a small minority of the communities. Hospital and nursing service, except in model communities, is not within convenient or even reasonable distance, taking into consideration the condition of the roads and the available transportation facilities.

Churches, or buildings which were available for church services, were found in a majority of the comunities. Frequently the same structure served more than one denomination, and other purposes than that of a place for church activities. In some cases the community has raised money for the erection of a church, the company contributing to the fund."

Probable life of the mines

"'Restricted life of mining operations' is frequently assigned as the reason for failure to provide substantial, permanent community organization, equipment, and resources."

"For over 60 per cent of the West Virginia mines the probable life remaining was given by company officials as thirty years or more,

running up as high as 200, and averaging over 42 years. In all the southern Appalachian states an average life of over forty years more was expected; in Illinois and Indiana, over thirty; while in Pennsylvania and Ohio, where the coal fields have been worked for a longer time, the averages were 28 and 24 years respectively, with over thirty years for approximately 30 per cent of the mines."

Of the 82 communities scoring less than 50 points in the rating scheme "there were 31 for which the probable remaining life was estimated by company officials at from thirty to a hundred years."

SANITARY CONDITIONS

"These sanitary surveys of bituminous coal districts had for their purpose the determination of the relative sanitary status of the places visited. In attempting to arrive at an equitable conclusion, use was made of a questionnaire in obtaining relevant information and a detailed rating form in recording the various factors involved. Both the questionnaire and rating sheet represent an extensive experience in the making of sanitary surveys by various workers connected with the United States Public Health Service. Consequently the ratings may be accepted as reasonable indications of sanitary values."

Environment

"In considering the environment and habits of the people residing in coal mining towns it must be remembered that mining is by its very character an occupation accompanied by a great deal of soiling of clothes and person. Houses near tipples and coke ovens are particularly prone to become stained and dirty, both within and without. Therefore, in reaching a conclusion the nature of the work must be considered and the impossible not be expected. However, it is at once apparent that insufficient study and attention has been devoted to the improvement of the general environment in many mining towns. For one thing it cannot be expected that grass, trees, flowers and gardens will thrive on slate dumps, where so many houses have been thoughtlessly located. Nor can suitable streets, walks or playgrounds be maintained under such conditions. While not directly concerned with sanitation, suitable environment is believed to exert a subtle yet nevertheless certain influence upon the human mind. Moreover, it is felt that a favorable mental reaction is reflected in increased happiness and contentment, which in turn aids in the maintenance of health.

"The absence of playgrounds in many mining camps, especially for the smaller children, is particularly noticeable. In a few of the larger places apparatus of a simple type is provided but the grounds are invariably in poor condition, the locations frequently difficult of access, while skilled supervision of play is universally lacking. Now that supervised play is deemed a necessary part of a child's mental and physical makeup some thought could

well be directed to this phase of health maintenance.

"There is another factor entering into the lives of the people residing in mining camps which has received but scant attention. Bath houses and change houses are lacking in the vast majority of the settlements. Dirty faced miners wearing their working cloths are so universal that any other condition would excite comment. In a very few patches, however, bath and change houses have been provided for the miners. Here the working clothes are kept and dried while the miner is at home, while his street clothes are likewise kept while he is working. After work there are ample facilities for thoroughly removing the dirt and grim acquired while at work. But even in these few places there are no public bathing facilities for the women or children. Likewise, there are no public laundries, such as might facilitate the washing of clothes, and eliminate unsightly and offensive accumulations of wash water from the gutters near the homes.

"With the advent of the low priced automobile and other means of quick and convenient tranportation, there is a tendency to desert some of the smaller mining patches and live in nearby cities. So marked has this migration become that many houses in certain districts stand vacant. This tendency is responsible for considerable improvement in the living conditions of the families that have migrated to the more favorably located and better administered communities. However, it is not an invariable rule that larger communities excel in sanitation, for many of the smaller places set and maintain high standards."

"The need for the Americanization of the foreign-born in our midst has been dwelt upon to a marked degree during the past few years. That such efforts are desirable cannot be gainsaid. However, the Americanization of the native born is almost as crying a need. Undoubtedly the most logical and effective method of inaugurating such a revolutionary process would be to create a more favorable environment. Interest in the transitional process is a prime requisite. Moreover, the change must come as a natural growth, rather than a sudden and unexpected change for which the people are unprepared."

Water supply

A comparison between the average water ratings of communities in anthracite and bituminous regions shows that those of the former are uniformly higher. This may be due primarily to the availability of large watersheds in the mountains of the anthracite district.

"In analyzing the situation with regard to provision for safe water, as well as for other sanitation, it is apparent that little use has been made of existing health agencies in solving the problems confronting the coal patches. Neither the State Boards of Health nor private water works engineers have been consulted in an effort to secure health protection. The easiest means of securing water, namely by digging shallow

wells, has too frequently been resorted to. That such sources of water might easily be contaminated through proximity to insanitary privies, that the communities might steadily increase in size and that the supply might be depleted during dry weather were facts apparently overlooked in very many places. Yet, a superficial examination of the existing facilities plainly indicates the possibility of obtaining great quantities of safe water through the simple expedient of impounding the water flowing from the neighboring hills. The retention of a competent engineer would solve many of the difficult problems at present confronting some of these towns."

Competent service could well be retained to solve and to educate mine workers in combating such problems as disposal of waste, construction of sewage systems, control of fly prevalence, protection of foodstuffs, and impure milk.

"In conclusion it may be said that while the general sanitation of coal patches is relatively low that the situation is not without definite possibilities for improvement. The absence of an official agency to which the company or municipal official may turn is one of the glaring deficiencies of the present situation. To supply this need it is suggested that a division of community sanitation in the Bureau of Mines of the Interior Department or a similar division in the Public Health Service, could render extremely valuable service."

COST OF LIVING

"To get information about the cost of living among miners' families, studies of prevailing retail prices and of the actual expenditures of families have been made by the Commission in ten representative mining centers of different character in West Virginia, Pennsylvania, Ohio, Illinois, and Alabama. In company-controlled communities it was possible to secure direct from sources of supply the more important family expenditures, as well as prices, rates of services, and rentals. Data on sales of merchandise were obtained from stores and mail order houses serving single patches or groups of communicating patches. Company records furnished information on rentals, cost of water, light, and fuel, as well as on mining population. In each district patches representing different conditions were selected and ten per cent of the families living in them were visited, to check over sources of supply and expenses as listed on company books, and to ascertain all other expenditures, the amount of home produce, the size of the family, number of working members, and sources and amounts of income. It will be appreciated that such a study as this involves a vast amount of detail and that, in view of the limitations of time and funds under which the Commission has worked, a comprehensive survey of the cost of living in all the sections of the country where bituminous coal is mined was out of the question. It will also be appreciated that it would not have been possible except at prohibitive cost, to make an exhaustive study of the cost of living even in the ten representative districts which were selected. Information on expenditures

is for the year 1922; data on prices are for December 15, 1922."

Adequacy of income

A tabulation of figures was made for the following six districts for 1922,—New River and Kanawha in West Virginia, Connellsville and Central Barnesboro in Pennsylvania, Belmont County, Ohio, and the Illinois Central District. A rough summary of the findings follows.

"The total amount available for the year in these six localities varied from $1,267.38 in Kanawha, to $1,934.66 in Belmont County, Ohio. Earnings by the head of the family ranged from $906.14 in Kanawha to about $1,250 in Connellsville and Central Illinois. In none of the six were the father's earnings enough to meet the bills. In the Ohio District they amounted to only 53.2 per cent of the year's expenses; ranging from that up to 82.7 per cent in the New River District of West Virginia. In none of the six, for that matter, was all income from current sources sufficient, but in all of them it was necessary to draw on savings, to borrow money, and to receive some assistance from strike funds or other sources. The relative importance of these additions to the current income was least in New River, where they made up 7.3 per cent of the purse for the year; greatest in Ohio, where they constituted 29.4 per cent. "Assistance" did not add much to the average resources; only in Kanawha, where the total budget was smallest, did it amount to as much as 2 per cent. The amount drawn from savings and the amount borrowed was no doubt determined rather by the size of deposits in the bank and available credit than by need, and were larger in the localities which are generally prosperous."

Food, clothing, and rent

The largest item of expenditure was food. "Nutrition experts have formulated standard dietaries for persons engaged in different degrees of activity. Probably few people, whatever their economic status, eat the approved kinds of food in correct proportion. Except for that reflection, the diet of these mining districts would be shocking. In all of them it is noticeable that the food purchased is food which appeases hunger at least cost. . . . The desirable revision of the diet can be brought about only by teaching daughters and wives about the needs of the body, and by training them in the selection and preparation of food. But it will require also increased expenditure. In the districts studied, food meeting the standard requirements in amount and character, taking into consideration the nature of the occupation and the size of the families, would have cost from $161.00 more in Ohio to $252.00 more in Alabama than was actually spent for food."

Clothing is the item next in importance in point of cost. "Except in Alabama and in regions where strike conditions affected purchases of clothing, the amount spent on clothing seems to correspond with that spent in industrial centers.

"As to rent, it is only in Illinois that the expenditure approximates

that of other wage-earners' families in industrial centers. Usually the cost of the year's shelter for miners' families does not amount to $100.00. The cost of electricity does not vary appreciably between mining districts and industrial centers, but the miners' fuel bill is but a small part of his expenses. In New River, where rates are low and not so much fuel is needed for heating as in northern states, $25.50 paid the year's bill. In Pennsylvania, where rates were frequently higher and more coal is consumed, the cost was but little more than $40.00 for the year."

"In general, wherever independent mining towns predominate, prices on all items except coal correspond with prices in wage-earning sections of nearby industrial cities. In localities where company-controlled communities prevail, prices of food are usually higher, but rents and cost of fuel are lower."

WAGE RATES IN BITUMINOUS COAL INDUSTRY

Examination of the wage structure of the bituminous coal industry has shown the presence of two outstanding factors. The more important of these is overdevelopment, and the lesser factor, although it is not by any means minor, is the existence of wide differences of physical conditions in different mines.

"The factor of overdevelopment has had a profound influence on the general level of the wage structure. But the effort to overcome the factor of a short annual working time by a compensatory wage level has failed to meet the problem satisfactorily, because of this very overdevelopment and the different ways in which it affects different mines. Thus if 200 days were an average annual working period and if all mines approximated anywhere close to this average, a wage which would give an adequate annual earning for 200 days' work would solve the difficulty from the wage earner's point of view. But unfortunately this has not been the case. In a year averaging 200 days, many mines may not work over 100 or 125 days, while other mines have operated well up towards 300 days. A wage based on the 200 day average, therefore, gives very high earnings to the men fortunate enough to be in the mines operating nearly the full working days of the year, while it fails to give adequate annual earnings to those who find themselves in the group of mines working 100 days. If these marked differences in days of operation were confined to separate fields, that is, if practically all mines in one field worked a large number of days while practically all those in other fields work a smaller number of days, the pressure for increased rates of pay would not be felt equally in both fields, but would exert itself most strongly in the fields with the fewest number of working days. But the differences in working time are not thus marked and segregated by the limits of different fields. The greatest contrast may be found between mines in the

same field. One mine with natural advantages and which has secured contracts for nearly its whole output may work steadily throughout the year, while neighboring mines almost within sight of this mine, may be shutting down over half the time because of inability to compete in the common markets. The result, therefore, has been for this pressure of increased rates to be felt throughout the entire organized field."

Although the mine workers' organization as far back as 1886 agreed with the operators that differential rates would have to be adopted in order to enable the poorer mines to continue in competition with the better mines, the interval between that year and 1920 has been replete with dissention and quarreling. The strike of November 1, 1919, was ended by the appointment of the United States Bituminous Commission and the granting of a temporary increase of fourteen per cent to the wages of all mine workers. The agreement of March 31, 1920, which was re-affirmed in January, 1923, has been extended to March 31, 1924.

"A third factor that has had a marked influence on both the general level and upon the variations in the bituminous wage scale in certain parts of the country is the existence of large non-union fields. Taking the country as a whole, both tonnage and day rates are lower in non-union than in union fields. If the relationship in earnings of the year 1921 is representative, the differences in rates are somewhat but not entirely offset as far as annual earnings are concerned by the greater number of days worked during the year. In 1921 the average number of starts made by tonnage men was 151 in non-union mines as compared with 135 in union mines. The average number of eight hour days worked by day men were 200 and 185 respectively. Nevertheless the average annual earnings for both groups of workers was lower in the non-union operations taking the country as a whole. Because of these facts wage rates have been separately presented for union and non-union mines. A survey of coal fields from the standpoint of labor organization therefore must necessarily precede the analysis of wage data."

LOCATION OF UNION AREAS

"In the bituminous industry the oldest organized territory is the central competitive field, extending from the Pittsburg region of western Pennsylvania westward through Illinois, Indiana, Ohio and Western Pennsylvania. A second center of unionism is the southwestern interstate field, lying between Iowa and northern Texas and consisting of Arkansas, Kansas, Missouri and Oklahoma. These states produce a little over four per cent of the total tonnage and employ 4.4 per cent of the workers in the industry.

"Directly north of the southwestern interstate field are the Iowa mines also thoroughly unionized. In the South is the partially organized state of Texas. In the Rocky Mountains, the union fields are located in Wyoming and Montana. North and south of the central competitive field are

some organized districts in Michigan and western Kentucky. East of the central competitive field lie the vast coal fields of central Pennsylvania. This region according to an official of the operators' association of that district is now "an 85 per cent unionized field." However, the number of paid up members enrolled in unions in this area as supplied by the United Mine Workers of America include at the present time only between fifty and sixty per cent of the total workers.

LOCATION OF NON-UNION AREAS

"The non-union areas, and in this group are also included districts that are partially organized but predominantly non-union, lie around the union fields in a broken crescent. The northern end of this crescent juts up into the Pittsburg District and central Pennsylvania. This non-union portion of Pennsylvania comprises the Connellsville, Latrobe, Ligonier and Greensburg regions and most of Westmoreland and Somerset Counties. These areas have long and successfully resisted all efforts toward organization of the mine-workers by the United Mine Workers.

"From non-union Pennsylvania, the crescent extends towards the south. It includes practically all of Maryland, West Virginia except the Fairmont district and the upper half of Kanawha, Virginia, Eastern Kentucky, most of Tennessee, and all of Alabama. West of the Mississippi River, the second half of the broken crescent begins with the lignite areas of eastern Texas, passes around the unionized mines of western Texas to New Mexico and extends northward taking in the states of Colorado and Utah. Insofar as the operations representing half of the tonnage of the state of Washington changes to a non-union basis in 1921, this state may be included in this group."

"A study of union and non-union coal areas brings to light several outstanding facts. In the first place, there is a tendency towards complete segregation of union and non-union mines. In manufacturing industries and the building trades, union and open shop establishments, as a rule, exist side by side.

"A second outstanding fact is the concentration of the union mines near industrial centers and consuming markets. With the exception of non-union Pennsylvania, the non-union areas are located, away from the manufacturing centers, in the mountains of West Virginia, and eastern Kentucky and in states comparatively undeveloped from the standpoint of industrial organization. With no nearby competing industries, the miners stand alone in their efforts to secure labor organization.

"When the present system of bargaining was established, the central competitive field embraced the bulk of the miners and the tonnage of the bituminous industry. Today 65 per cent of the total tonnage is produced and a similar proportion of the wage-earners are located in outlying fields."

BASES OF PAYMENT FOR TONNAGE MEN

"As previously pointed out in the consideration of the occupational classification of mine workers, about

60 per cent of the wage-earners in the industry are tonnage men. To comprehend the wage structure and the complications involved in arriving at bases of payment for this group of workers, a general knowledge of the work involved and the varying conditions under which coal is produced, is indispensable.

"A bituminous mine may be conceived as a subterranean city carved out of a layer of coal. These coal layers or strata vary from less than 2 feet to over 40 feet in height. They are seldom horizontal, but tilt with the geological formation of the region. Frequently the top and bottom strata cut into the coal and sometimes replace it entirely.

"Some of the miners work in the airways and haulageways or entries. The bulk of the miners, however, dig their coal in rooms driven off the side or butt entries. One or two miners, are assigned to a room.

"In bituminous mining, the solid layer of coal is usually undercut, that is to say, an open channel or kerf is cut along the entire length of the coal face, either at the bottom of the coal vein or in the fire-clay floor underlying it. Sometimes the cut is made at the top of the seam or in bands of shale or clay, which in certain seams are found as partings. The depth of the undercut varies from three to six feet. The height also varies depending upon whether the work is done with pick or machine. When the work is done by hand, the miner lies on his side and protects himself from falling coal by setting short props under the edge of the coal as he works his way in with a pick.

"In 1921 about 19 per cent of the coal was mined by hand and approximately 66 per cent was undercut by machine. The balance of the coal 13.8 per cent was "shot off the solid" i.e., blasted down without undercutting and 1.2 per cent was taken out by stripping operations. (United States Geological Survey Bulletin No. 280, 1922).

"The work of the miner is not confined to undercutting, drilling powder holes and blasting down coal. After the coal is shot down, the slate and other refuse such as rock, sulphur balls, bone coal, etc., must be removed by hand picking. Furthermore tracks must be laid from the working face to the entry switch so that the mine cars may be brought to the miner for loading.

"There are other items of work, which in many instances are considered part of the miner's task. In practically all mines the tonnage men are responsible for the care of their room. This means they are required to set props and, in some cases, cribs under the unsafe places of the roof. In gaseous mines brattice work may be necessary. Where the coal is low or thin, it is often necessary to take up some of the floor or brush down a specified thickness of the roof in order that sufficient head room is available. Cars must be pushed from the haulageway to the face and back. When, owing to defective or inadequate timbering the roof caves in, the fallen refuse must be removed. Where the working place is wet, the water must be bailed out. All work other than that of undercutting, drilling, shooting, and loading coal is commonly spoken of as "dead work."

"As already explained, tonnage men are, in the main, piece workers. In this group are included the pick miners, the machine cutters and their helpers, and machine loaders.

"In general, the unit of payment to these workers is a ton of 2,000 pounds. In many of the mines in Pennsylvania and Maryland a 2240 pound ton is used, particularly in the non-union mines. In West Virginia, Pennsylvania and Virginia, non-union mines often pay on a car basis. In some instances, especially in the case of machine cutters and their helpers a per day rate is paid.

"When the working place is narrow as in driving the entries or haulageways the men are often paid an additional rate for every linear yard or foot the working place is advanced. This is usually spoken of as yardage. A yardage allowance for narrow work is a standard practice in almost all of the union fields and is also paid in many of the non-union mines. However, many non-union mines do not differentiate between narrow and wide work and others pay a somewhat higher tonnage or car rate for work of this nature.

"Yardage is often paid in addition to the regular tonnage or car rates for the removal of slate, clay, bone and sulphur, occurring in the coal seam; for taking down the roof or taking up the bottom in entries where the seam is not of sufficient height; and for mining low coal, i.e., where the coal seam is, say, less than 24 inches high.

"Varying practices also exist as regards the payment of other items of "dead work." In central Pennsylvania six cents per ton is allowed for pushing cars while in most fields the miners push their cars without extra compensation, this being considered an item covered in the tonnage or car rate. In some mines the day men lay the tracks in the miners' rooms but in others this work is considered a part of the work to be performed by the miner. The setting of props and cribs, the removal of falls, etc., may or may not be included in the rate per ton or per car. Operators in some of the West Virginia fields have pointed out that the miner in their region "does not lay his tracks, push his cars or handle slate, as he does in the competitive district of eastern Ohio and western Pennsylvania." Work of this nature, they claimed, is handled by day men. This statement is substantiated to some extent by the higher proportion of day to tonnage men in that state. The variation discussed above is found not only as between union and non-union areas but also among the mines in the different union fields. In view of these differences in the job content a comparison of tonnage rates is obviously impractical.

"In discussing rates for tonnage men, it must be remembered that there are numerous coal seams in the bituminous industry. The height of these seams, the presence of impurities such as clay, rock bone, shale or sulphur bands, and the character of the roof and floor vary not only from seam to seam, but within the same seam as the work progresses. The effect of these variations upon the work of mining is shown in the results obtained in a

study of timbering requirements in the coal seams of Illinois. It was found that the average number of props that had to be set per 100 sq. ft. of roof was 2.9 in one district; 3.2 in a second; 3.4 in a third; 5.5 in a fourth, etc., the highest average number of props being 6.1. (Bulletin No. 13, 1915. Illinois Coal Mining Investigations Cooperative Studies).

"Probably the greatest single factor affecting the amount of coal mined per day and consequently the tonnage rate, is the height of the seam. In 1917 an analysis of the output per man per day in coal beds of different thickness showed that the average output per man per day in seams two to three feet thick was 2.41 tons; in seams five to six feet, 4.18 tons; in seams six to seven feet 4.27 tons; in seams seven to eight feet, 4.67 etc. (Coal in 1917, C. E. Lesher, Mineral Resources of the United States, Part 11, p. 945).

"From the above discussion it must be clear that owing to differences in job content and the variation in output due to geological conditions affecting the work of mining, a comparison of tonnage rates alone would be meaningless."

Rates for tonnage workers

Although pick mining is rapidly being replaced by machine mining, the structure of rates for tonnage work continues to be based on the pick mining rate over practically the entire union field.

A table based on wage rates of pick miners in union fields compiled so as to show the actual rate per ton on April 1, 1912 and on January 1, 1923, and relative rates taking the rate of April 1, 1912 as 100, points to the fact that in the central competitive field only one general decrease was made between 1898 and 1923. This occurred in 1904 and lasted two years. "The rates in the . . . . . table show the differentials that have been agreed upon by the miners and operators in an effort to make allowance that would tend to overcome differences in vein and other physical conditions of mining, as well as differences in freight rates to common markets, and thus permit the poorer or more remote mines to overcome their natural handicap in the competitive struggle."

"The collective contract made jointly by the representatives of the two sides for the entire competitive field fixes only the rates for the basing points,—that is, the rate is fixed for the Hocking Valley district in Ohio, for Indiana, for the thin vein mines of western Pennsylvania, and for the Danville district of Illinois. The representatives of the other districts then hold separate meetings and agree upon rates fixing differentials above or below the rates agreed upon for the basing points.

Another table "shows for the southwestern interstate field the same information as is given in the table of the central competitive field, except that in the southwestern field data prior to 1902 were not available. The rates in this field are fixed in joint conferences by the representatives of the two sides from the four states. It should be noted that the agreement in the Southwestern field differs from the one made in the

central competitive field, in that the Southwestern agreement does not fix basing points, but fixes the different rates for the mines of the different sections in the one interstate agreement.

"The figures showing the actual increase in rates per ton in 1923 as compared with 1912 in the southwestern interstate field show two increases out of line with all the others. While 47 cents represents the increase in seven of the fields, the thin veins in Missouri were given an increase amounting to .717, or about one and a half times the increase of the other fields; and the thin vein in Kansas was given an increase amounting to 1.217. These increases, so far out of line from the others, were necessitated by the extreme thinness of these veins, in order to enable the miners to overcome the handicap in earnings due to inability to produce more than a comparatively few tons per day

"In addition to the central competitive field and the southwestern interstate field, in which the contracts are made collectively for each field respectively, as above described, there are a number of other union fields each of which negotiates its individual separate contracts. Thus, while western Pennsylvania is included in the central competitive field, and negotiates its basing rate through the joint conference representing Illinois, Indiana, Ohio, and western Pennsylvania, the union mines in the central Pennsylvania field are not included in the central competitive field and the operators of that district negotiate their own agreement with representatives of the Union. Similarly, the operators of Iowa negotiate their own agreements, as do the operators in Michigan, in Montana, in Wyoming, and in western Kentucky.

"Although the operators and miners in the separate states or sections of a State enumerated above negotiate their own agreements, their joint conferences are held after the agreement has been reached in the central competitive field, and the wage rates agreed upon in the joint conferences in these several states are to a large extent governed by the rates that have previously been agreed upon in the central competitive field.

"One of the grievances of the operators in some of these outlying states—frequently referred to in the vernacular of the industry as "outliers"—is that they are to a large extent governed by the settlements made in the central competitive field but that they are not allowed to take any part in the negotiations. At different times a number of these states have endeavored to have the joint conference which sets the rate for the central competitive field, enlarged to admit them to the conference, on the ground that this conference is, in effect, fixing their rates and that they should be allowed to join the conference and have their rates established by this larger conference at the time of establishing the rates for the states in the central competitive field. Up to this time, none of these states has been able to secure admission."

The comparison of rates alone does not necessarily give an index

to the earning power of miners, for physical conditions under which the work is done has a pronounced effect.

Mention has been made of the extent to which machine mining has to a large extent displaced pick mining. Machine mining amounts to 52.8 per cent of the total in Indiana, 65.9 per cent in Illinois, and 91.6 per cent in Ohio.

"Certain differentials have been agreed upon for machine mining as compared to pick mining, varying in different districts. Thus in the Danville district of Illinois, the machine mining rate is 10 cents per ton less than the pick mining rate, while in other districts of the State, it is 7 cents less. In Hocking Valley, the machine rate is 17.5 cents less than the pick mining rate. For a considerable period of years these differentials between pick and machine mining have been maintained at the same flat rate. When, therefore, the pick mining rate has been agreed upon the machine mining rate is at the same time automatically fixed. The machine mining rate, however, includes two groups or workers,—those who operate the cutting machines, and those who do the drilling, blasting, and loading after the coal has been undercut. The first group is usually referred to as machine miners, or machine runners, or cutters; the second group are usually classified as loaders. The machine operators are further subdivided usually into two classes,—the machine runner and an assistant or helper. The total rate fixed for machine mining is divided between the machine runners and the loaders. The division of the total machine mine rate per ton between the machine runners and the loaders is in some instances provided for in the collecvive contract while in other instances it is determined at individual mines.

"A low rate per ton to the machine runner is compensated for by the large tonnage with which the machine runners are credited. The machine is operated in a number of chambers being removed from one to the other as fast as the undercutting of the coal in a chamber is completed. Thus the combined tonnage which a considerable number of loaders obtain would be credited to the runners of a single machine, and the earnings studies show that at the comparatively low rate per ton the machine runners make larger earnings than the loaders."

Although it has been possible to reduce to a more or less summary form the trend of tonnage rates for unionized fields, this does not hold for non-union fields, for the rates vary from mine to mine and the changes in rates have been so numerous as to preclude any effort to condense them.

"However, certain outstanding differences in the rate structure and in the trend of rates can be pointed out, between the union and non-union areas. Thus in the various union fields, excepting the union mines of West Virginia, there have been, with a few unimportant local exceptions, only 5 changes in rates from April, 1912 to January, 1923. In contrast with these, in 94 non-

union mines tabulated in West Virginia, the rates for pick mining show many instances of eight, nine and ten changes, and even as many as twelve and thirteen, between 1912 and 1923. In Alabama as many as fourteen and fifteen changes in the same period are shown; and a number of instances of eleven changes and one case of thirteen changes are shown in the rates for non-union mines in Kentucky. A further contrast is shown in the periods between the changes, in the union and non-union fields. Thus, in the union fields, the 1912 rate continued in effect until April 1st, 1916; there were three changes during the war years, 1917 to 1919, but the 1920 rates in the union fields are still in effect and will continue until April 1st, 1924. In contrast with this, there were two changes in many of the non-union mines of West Virginia in the year 1920, followed by another in 1921, one and sometimes two during the first six months of 1922, and one in the last half of the same year. In some instances there were as many as four changes in rates at these mines in the year 1922 alone.

"Similarly, there were changes in the second half of 1921 at the non-union Alabama mines, in some instances two changes in the rates during this period. Two changes in the rates at many of these mines occurred again in the first half of 1922; and a further change in rates was made again at most of these mines in the second half of 1922. The same general conditions for the year 1921 and 1922 are shown to exist for rates in the non-union mines in Kentucky.

Similar contrasts between the union and non-union fields are found in the trend of rates. In the union fields with a few negligible local exceptions the five changes in rates since 1912 represent substantial increases in rates. The changes in the non-union fields up to the beginning of the year 1921, also show, with a few local exceptions, continuous increases. While the rates of the union fields have remained stationary from April, 1920 up to the present, and will continue on the existing scale until April 1, 1924, the numerous changes in rates in the non-union field, both in the year 1921 and in the first half of 1922, are with few exceptions, decreases in rates. Thus in the non-union mines of West Virginia, decreases began in the first half of 1921. A considerable number of mines made decreases in the second half of 1921, in some instances two decreases in rates having occured in that period. There was a very general reduction in rates in the first half of 1922. The same tendency toward general reductions in the second half of 1921, as well as in the first half of 1922, appears in the tables for the non-union mines of Alabama, two and three changes in rates being shown in some instances. The reductions in the rates at the non-union mines in West Virginia in 1921 and the first half of 1922 were in many cases, made to offset the increases granted during the war stress in 1919 and 1920. Consequently these reductions brought the scale back to what it was at the end of 1917. In some instances however, the decreases of 1921 and 1922 more than offset the

increases granted in 1919 and 1920 and brought the scale below what it was at the end of 1917. In the non-union mines of Alabama the reductions in rates for pick mining were more drastic than in West Virginia and in some cases brought the rate back to the 1916 base. In the second half of 1922, however, the demand for bituminous miners following the termination of the five months suspension in the union fields brought about a general increase in the rates for all classes of tonnage workers in the non-union mines of West Virginia, Alabama and Kentucky. In some instances the increases given in West Virginia mines in the second half of 1922, entirely offset the decreases of both 1921 and the first half of 1922. In other instances, the increases did not quite make up for these previous decreases.

"The showing in the non-union mines of Alabama made in the detailed tables, in very different from that of the West Virginia mines. The decreases in Alabama in the year 1921 and the first half of 1922 were heavy, and amounted in some cases to 30 per cent. The increases made in the second half of 1922 did not begin to off-set the reductions made in 1921 and the first half of 1922.

"Barring one or two notable local exceptions the flat increase over the entire union field as between April 1, 1912 and January 1, 1923 was in most cases 47 cents, with a few variations ranging as low as 43 cents and as high as 48, 50, and 55 cents. In general it can be said that the flat increase granted in the bituminous field since 1912 approximates 47 cents per ton. In contrast with this uniformity data show for the pick miners in West Virginia flat increases as of January 1st, 1923 over April 1st, 1912, as high as 75.6 cents and as low as 25 cents. The bulk of these increases fall in groups between 30 and 40 cents, and again between 40 and 50 cents per ton. In the matter of flat increases as in the other items already referred to, the non-union mines of Alabama stand out in contrast to those of West Virginia. Thus the total flat increase in the pick mining rates of January 1st, 1923, over April 1st, 1912, shows a maximum of 37 cents per ton. A number of increases are as low as 25 cents and in some cases the total increase in the 10 year period is only 20 cents.

"In a general way, the analysis and comparisons made above of the rates and the changes in rates for pick miners in West Virginia, Alabama, and Kentucky, reflect the conditions shown for other tonnage workers in the same mines in these states."

Rates for day men

"About forty per cent of the wage-earners in the bituminous industry are classified as day men. These employees are usually paid by the day, but in some instances they are paid by the month, week, or hour." The Coal Commission's analysis for union fields was based on hourly rates submitted by the operators and on wage scales in effect and forwarded by the United Mine Workers of America.

The analysis shows that brakemen and drivers in the central competitive field received 35.5 cents per hour on April 1, 1912. On January 1, 1923 this rate had been increased to 93.75 cents per hour representing an increase of about 58 cents per hour. "The rate of 1903 remained in effect until 1904; the increased rate given in 1904 remained effective for two years. The rate given in 1906 was continued until 1910; the rate agreed upon in 1910 remained unchanged until 1916. The rate for the year 1916 was to have remained in effect for two years or until April 1918, but, as previously explained, the rapid increases in the cost of living and the unprecedented demand for labor necessitated a revision in rates during April 1917. For the same reasons a further revision of rates followed in November, 1917 and again in December, 1919." With a few minor exceptions no revisions of hourly rates for these two classes have been made in union fields since August, 1920.

"The practice of maintaining rate differentials, so important in setting tonnage rates, is not generally applied to the wage scale of day men. In a few local fields, as for example, the Pomeroy and Jackson Districts of Ohio and a few scale districts of Illinois, lower wage rates have been consistently maintained, but these instances are uncommon. Day men are seldom on a piece rate basis. For this reason the physical conditions under which the coal is produced do not directly affect the earning capacity of these workers.

"As early as 1898, under the terms of the Columbus Day Wage Scale, a uniform work scale based on an eight hour day was formulated for a limited number of inside day men in the central competitive field. This scale was arrived at by first taking the average of the wages paid in all of the competitive districts and reducing this average to an eight-hour day and then adding the increase previously granted. The scale committee fixing the rates for this class of workers failed to agree upon a similar scale for the outside day men owing to the wide variations in the conditions of employment under which these wage-earners were engaged and referred the matter to the Inter-state joint convention of 1899.

"No further action has been taken by the inter-state conferences in the matter of a uniform scale for outside day men. Until 1904 the compensation of these workers was arrived at by the employers and the employees in the various districts. In that year the Hocking Valley district established uniform rates for some of the major outside occupations and for the unskilled workers. This practice has been followed by other fields including those not in the central competitive group. Ever since 1898 the collective contracts of the central field have provided for percentage or flat increases to inside day men whenever adjustments in tonnage rates were made. It was not until 1916, however, that increases in rates were specified for outside day labor."

The data obtained and tabulated by the Commission show that there is a remarkable uniformity both in the trend and in the actual rates paid in the union field for six inside

and four outside day occupational classes, *viz.* brakemen, drivers, motormen, trackmen, trappers, blacksmiths, carpenters, firemen, and laborers (inside and outside).

"A comparison of the rates paid to inside and outside day men and those paid to pick miners brings to light the fact that, during the eleven-year period (1912–1923), greater percentage increases have been given to day men. Thus, with a few minor exceptions, the percentage increases paid to pick miners in the union fields, with the exception of West Virginia union areas, range from 137.0 to 183.8 per cent, the significant range being from 156 to 183. In contrast to these gains the inside and outside day men have secured percentage increases ranging from 239.0 to 357.1. In a few districts the relative increases over April, 1912, were less than 264 per cent and in some instances the relative increase exceeded 300. A similar comparison of the relative gains of day men and machine cutters and loaders would be greatly in favor of the day men.

"The same outstanding differences in the rate structure and in the trend in rates between union and non-union fields pointed out in the discussion of tonnage rates are characteristic of the wage scales of day men. For example, taking the union fields as a whole, excepting the State of Michigan and the union mines of West Virginia, there were 6 changes in rates from April, 1912, to January, 1923. In contrast with these, in 88 non-union mines tabulated for West Virginia, there were 3 mines showing 8 changes in rates paid to brakemen, 6 showing 9 changes, 15 showing 10 changes, 3 showing 11 changes and 6 showing 12 changes. A similar number of changes in rates took place in the non-union mines of Kentucky and Alabama. In the non-union area of Pennsylvania 25 mines specified 14 changes in the rates to brakemen. This illustration for one occupation will serve to show the frequency of change in the non-union fields.

"A contrast of the periods between which changes in the union and non-union fields occurred will serve to indicate the differences in intermittancy. In the union field the 1912 rate remained in effect until April 1, 1916; there were three changes during the war years, but the rate of August, 1920, has been maintained unchanged and will continue in effect until April 1, 1924. In non-union West Virginia, Alabama, Kentucky and Pennsylvania there were two changes in many mines during the year 1920: one in the first half of 1921, one or more changes both in the first and second half of 1922.

"Similarly there were contrasts between union and non-union fields in the trend of rates. In the union fields the five changes in rates since 1912 represent substantial increases. The changes in non-union mines up to the beginning of the year 1921 also show, with a few exceptions, continuous increases. While the rates of the union fields remained stationary from April, 1920, to the present, the numerous changes in rates in the non-union field, both in the year 1921 and in the first half of 1922

are with few exceptions decreases in rates. Thus, decreases began in practically all non-union areas in the first half of 1921. In non-union Pennsylvania, Colorado, and Kentucky, there was a general reduction in wages during the second half of this year. A considerable number of mines in West Virginia made further decreases in the first half of 1922, similar reduction occurring, to some extent, in many mines of other fields. In general these changes in rates were made to offset the increases of the war period. In many cases the decreases were more drastic. Thus in West Virginia the decreases ranged from 10 to 51 cents per hour, in non-union Pennsylvania from 3.1 to 45 cents, in Eastern Kentucky from 10.5 to 34.8 cents and in Alabama from 8.6 to 29 cents.

"During the years 1921 and 1922 16 mines in West Virginia made decreases varying from 30 to 35 cents per hour, 13 from 35 to 40 cents, 3 from 44 to 55 cents, 1 mine made a 48 cent cut, another a 49 cent and still another a 51 cent reduction. In Pennsylvania 31 mines made reductions ranging from 25 to 30 cents and 16 mines from 30 to 32 cents per hour. The reductions in a considerable number of mines brought the wage scale back to what it was at the end of 1917.

"In the second half of 1922, the demand for miners resulted in a general increase in wages throughout the entire non-union area. In many cases the increases given entirely offset the decreases of both 1921 and the first half of 1922. In Alabama, however, as late as January 1, 1923, the major part of the reductions were not offset by increases.

"In the discussion of the rates of day men in the union field it was pointed out that the flat increase between April 1, 1912, and January 1, 1923, was, in practically all cases, between 57 and 59 cents per hour. In contrast with this uniformity the detailed tables for day men in the non-union field show a wide variation in the flat increases granted during this period. Thus in non-union Pennsylvania the range for blacksmiths was between 33.5 and 79 cents; in West Virginia between 30 cents and 74.8 cents; and in Alabama between 3.2 cents and 24 cents. In West Virginia 20 mines paid a flat increase of between 62.5 and 74.8 cents per hour over the April 1, 1912 rate, ten between 58.5 and 62.5 cents, 10 between 55 and 58.5 cents and 5 between 50 and 54 cents. In Alabama one mine granted a total flat increase of 15 cents, 1 of 49.2 cents, 2 between 52 and 54 cents, 1 of 57 cents, another of 64 and still another of 66.9 cents per hour."

EARNINGS IN BITUMINOUS COAL INDUSTRY

The study of earnings in the bituminous industry is based on data for the year 1921 on 332,668 workers who were employed in 1177 union and 751 non-union mines located in 23 coal producing states.

BASIS FOR STUDY

"The year 1922 could not be selected for a study of earnings as the study was undertaken before the completion of that year and the strike of five months in 1922 so seriously affected, in opposite ways, the earnings of miners in the union as well as the non-union field, that figures based upon that year would not have been representative in any degree. There was considerable discussion before 1921 was taken as the year for which to secure earnings, the representatives of the operators urging the collection of wage figures for 1920 in preference to 1921, on the ground that 1921 was an abnormally poor year in the industry as the bituminous mines of the country in that year worked only 149 days. They, therefore, urged the adoption of 1920 as a more representative year. But the year 1920 in which the bituminous mines of the country averaged 220 days, would have been equally unrepresentative on the other side, since if we exclude the high production years of the war period 220 days represents more than the average working time of bituminous mines in a number of years. Moreover, a considerable increase in wages was effective during the last four months of 1920, which seriously complicated any earnings study based on that year, whereas the wages of 1921 not only remained the same throughout the year in the unionized fields, but the scale of that year was continued in effect after the strike until April, 1923 and was again renewed for another period until April 1st, 1924. A further complication arose from the fact that the non-unionized fields represent a considerable per cent of the annual bituminous output. In these fields there is neither the same uniformity nor the same stability in wage rates as in the unionized fields, and the year 1920 represented a low point in the wage rates in the non-unionized fields as compared with 1921. There was, therefore, no valid reason why the Commission should decide not to take 1921, the last full year of operation before the long suspension of 1922 and to select another year farther back merely because it would have shown larger opportunity for earnings in the unionized fields.

"An equally complex question arose over the basis to be adopted for showing the earnings of any year that might be selected. It was urged that the only fair showing would be that of men who worked throughout the year, or who at least took advantage of practically the entire opportunity for earning; but this would have been an arbitrary basis and would have failed to show an element that has an important bearing upon annual earnings. This element is the large proportion of men who have one reason or another for leaving one mine or working place seeking better opportunity for earnings, and who through this process inevitably lose considerable time. Detailed tables show the number of men earning under $100, those earning between $100 and $200 those earning between $200 and $300, and so on up to those earning $4000 and over. This obviously leads to a

very large duplication of names. It is clear that the earnings of those in the lower groups do not represent annual earnings; but a corrective is supplied by the tables in showing the average starts made per man in each of the classified hundred dollar groups.

"It will be noted in studying the tables that the rates for men who were paid *by the day* is given on the basis of earnings of such employees for an eight-hour day. No similar basis could be adopted for the group of workers classified in the tables as tonnage workers since these employees are piece workers and no satisfactory record is available as to the number of hours that a tonnage worker may have worked per day to make the earnings shown in the tables. In dealing with the *daily* paid men therefore, the term *per day* is used in connection with their daily earnings, while in the case of tonnage or piece workers the term *per start* is used; since, as just stated, it is not possible to determine how many hours per day were worked by tonnage workers on the days when they actually went to work, or made 'a start.'"

METHOD

"In order to secure the minimum of necessary information upon which to base a record of the earnings of mine workers, it was essential to have reported for each mine:

(1) Gross earnings for each employee.

(2) Net earnings for each employee.

(3) Starts made, or days and hours worked by each individual.

(4) Working time of the mine.

"The instructions for reporting these data and the forms to be filled out were sent to all companies having mines which produced 50,000 or more tons of coal per year. At the same time a request was made for a report on all other mines of the company even though there was not the specified capacity of 50,000 tons. Each concern was asked to give a separate record for each mine with the name and occupation of every man who appeared on the roll at any time during the entire year, with the exception of those in supervisory positions, showing the gross earnings in each pay period, and the actual time worked in days, hours or starts. The earnings data secured by the Commission were, thus, a transcription of the payroll for each semi-monthly pay period. The total of these semi-monthly amounts was the gross earnings of each employee for the year for all time spent at any one mine. In addition a net earnings figure to be discussed later was secured for each employee for the time he worked at a given mine."

Classification of occupations

The major occupations tabulated were resolved into the following classication: *tonnage men*—machine miners pick miners, and loaders; *day men (outside)*—blacksmith, carpenter, engineer, fireman, stableman, outside laborer, miscellaneous; *day men (inside)*—brakeman, bratticeman, cager, door tender, driver, electrician, motorman, pumpman, timberman, trackman, inside laborer, miscellaneous.

"Throughout this report the workmen in the first three groups in

the list, (i.e., machine miners, pick miners and loaders) are referred to as tonnage men and have been tabulated separately except in cases where it was impossible to distinguish between pick miners and loaders or machine miners and loaders. This might arise in situations where a man would work one day as a pick miner and the next as a loader and have coal coming out on each day under both classifications. Sometimes machine men do both cutting and loading. This may occur when a small group of men are working a territory of insufficient size to warrant the use of two regular machine men. At some operations it is customary to provide machine men with working places so that when they are not cutting coal they may be employed at loading. In all cases where it was impossible to make a distinction between the two groups they were kept together and shown as one combined group.

"Most of the names of the day occupations are sufficiently explanatory to indicate the general duties of the employees who are grouped under the respective titles. As any number of titles occur in the different areas for the same jobs and identical terms may be used when the jobs to which they apply differ wholly in content, no attempt was made to standardize terminology for occupations. For this reason only the terms generally accepted were listed individually while all others are grouped under 'miscellaneous.'

"The classification of occupations for tonnage men was especially difficult in Alabama. In many mines in all the southern areas, it is usual for the company to engage a contractor to operate a part of the mine. He may be responsible for production in an entry or in a specified number of rooms in a section of the mine. He hires the man, supplies the equipment and explosives and guarantees the delivery of coal from the section of the mine for which he has bargained. In the same way other sections of the mine may be worked by other contractors. The system makes possible closer supervision of men than can be given by a mine superintendent. It also limits the use of explosives, it is claimed, to a small number of skilled miners. Workmen are responsible to and are discharged by the contractors. Generally, the men are paid at the offices of the company on the basis of time reported by the contractors.

"In the instructions of the Coal Commission for filling out the earnings schedules, operators were requested to eliminate the records of contractors. This was not easy in all cases. In the first place, a contractor may have two or three men working for him, or as many as fifty to one hundred according to the number of rooms in which he operates. Besides many miners at one time or another try contracting. While these men may be on the payroll as contractors for a part of the year, they may have made their major earnings as miners and have been reported as such."

"In the tabulation by occupations each man was classed in the group where his major earnings for the year were made without regard to

his occupation at the beginning of his employment. Thus the earnings represent the earnings of each man in all occupations in which he was employed, the one in which he made his major earnings determining his occupational group.

"In addition to the usual difficulties of securing earnings of employees the coal industry has many complications peculiar to its own method of operation. In common with many other industries payment for some occupations is based upon the amount produced, for others upon the time worked. Gross earnings include also, in most cases, a number of items of cost which should be considered properly occupational expenses, such as explosives, blacksmithing, etc., items necessary to the performance of work and for which the employee pays. It would, of course, have been preferable if the actual amount of these occupational expenses charged against the individual miner could have been determined and deducted for each regular payment made to him. But as they appeared on the payrolls along with other deductions such as rent, coal, and store supplies, no single entry could be considered as the net amount earned by the individual. In cases where they were separated, to secure the charges for each workman meant adding three or four items and subtracting the totals of these from the gross earnings. In many cases explosives were charged in the commissary account and could be procured only roughly for tonnage workers as a group. In still other cases it was necessary to get an estimate from the superintendent of the usual expenses for each one hundred dollars earned. In all records used in this report, deductions were secured either from the actual amounts paid, or from the estimates of superintendents, or from the average cost at other mines operating in the same vein of coal.

"Throughout this report the earnings shown are net amounts after all deductions have been made from gross earnings. The principal items for which deductions are made are blacksmithing, powder, dynamite, electric exploders, fuse, caps, carbide, lamp oil, machine oil, and payment for the wages of a checkweighman. By far the most important item is the cost for powder.

"The expenses for powder varies with the individual; some using more than others for the same work. The amount of all occupational expenses also varies for the major occupational groups. Outside day men have no charges. For inside men the cost of light, mainly carbide, varies from four to twelve cents a day. Some mines make a daily lamp charge of 5 cents. The charge for inside men would seldom be more than one per cent of the gross earnings and would range normally from one half of one per cent to one per cent of the gross earnings of each inside day man. The deductions for occupational supplies for machine runners average about one and one quarter per cent of the gross earnings. Exception to this is found in one area in West Virginia where deductions for machine runners in 32 mines are reported as high as four per cent.

"Occupational expenses are of significance when one considers pick-miners and loaders. Pick miners pay for powder, squibs, paper, blacksmithing, carbide, fuses, caps, etc. Blacksmithing is generally a flat charge of 25 to 50 cents per month. In some cases it is based on tonnage, in others on each dollar earned. This expense decreases per $100.00 as the miner's earning power increases either by skill or by hours worked. That is to say, a man pays 50 cents for tool sharpening whether he loads one hundred tons or three hundred tons of coal in a month.

"The usual cost to a pick miner or loader for all occupational items amounts to from five to ten per cent of his gross earnings."

"The differences in occupational expenses must not be understood as primarily due to differences in charges for supplies. As already stated the expenses for powder vary with the individual. The amount of powder used would vary also with the shooting qualities of the coal and the methods of mining.

"In some cases the company bears the expense of powder. In others the variations in the amount of deductions are due somewhat to the specialization of occupations.

"The work formerly done by the miner now tends in some cases to be subdivided among a special group of men who undercut the coal and another group engaged as shot firers. Shot firers are paid by the day or by the amount of coal produced, the powder and other shooting material being furnished by the company so that no powder charges are made against the miners. That such specialization has not affected a large number of mines is seen from the fact that out of the 1515 mines studied, the loaders had no deductions for explosives in 36 mines and the pick miners none in 78 mines."

"In getting a record of time for day men it was possible to obtain the actual number of days and hours worked. In some cases this time was reported in days, in some in hours, but in order to have a uniform basis of comparison records in hours were reduced to an eight hour day. In mines where a longer day or seven day week is customary in general or for some specific occupations, the basis of eight hours results in showing the employees at work more days than there are in the calendar year.

"Few companies keep a record of the number of hours spent by tonnage men either in the mine or at the face. To ascertain the total number of starts each tonnage worker made during each pay period, it was necessary to ask companies to report the actual number of days on which a miner was credited with one or more cars of coal.

"If the tonnage worker was temporarily transferred to day work, or what is commonly called company work, the actual number of eight-hour days, or fractional parts of days, which he worked, were added to the number of starts made as a tonnage worker. Some companies keep records of attendance from which they were able to report individual starts. A few reported the number of days each miner started

by taking the record from the lamp house. An exact record can be obtained where it is customary to make a lamp charge of 5 cents for each day the miner works. In the main, the weigh bulletins had to be used as a record of time and a man was counted as at work when a pit car was dumped at the tipple with his check number upon it. There is some error in this method. In the first place, the last car or cars a miner loads for the day may be left in the mine and hoisted on the subsequent day. Thus if a miner were absent he would still be credited with a car of coal and consequently a start. On the other hand, a miner may be shooting slate, or cleaning a fall of rock for one or two days during a pay period and be credited with no coal for these days. He might even be in the mine and loading coal which could not be hoisted until the following day. Counting the days when a miner works without having coal hoisted tends to offset the error of considering men at work when coal is dumped and credited to them when they are not in the mine."

"Three problems were kept in mind in tabulating earnings data. The first was the income in each of the occupations. The second was the time worked to secure the payments reported. The third the distribution of time throughout the twenty-four payroll periods. Earnings were tabulated for each occupation in intervals of $100, and the corresponding time in intervals of ten days. Earnings of the two major groups (tonnage and day) were tabulated by the same $100 interval with the corresponding number of payroll periods.

"In compiling the primary tables for this report the mines were separately tabulated for every name reported before this tabulation was combined for the individual occupations in a district. Thus an employee who shifted from one mine to another was counted on both rolls and recounted every time he made a change during the year 1921.

"Wherever mines are closely grouped it is certain that the names in the lower service groups appear repeatedly on the reports from the various mines, and there may be some recounting even among the central earnings classes. The number of men as given on the various reports of mines make a total in excess of the number of positions in the workings reported.

"This shifting group was included in the report to give a correct picture of the mobility in the industry and to show the very large percentage of men who work only a few days in a mine and then move on to another, in contrast with the steady long service group.

"The conclusions of the report where it is made apparent that daily earnings are lower for short service men in tonnage occupations demonstrate the significance of the group having kept separate. In fact the earnings per start for tonnage occupations show that the men who change most are those making the lowest earnings."

FINDINGS

Distribution of days or starts for union and non-union miners in three major tonnage occupations according to class intervals of earnings

I. *Machine miners.* Based on 13,061 union miners and 8919 non-union

EARNINGS IN DOLLARS	STARTS MADE	
	Union	Non-union
500–600	67	70
1000–1100	112	144
1500–1600	157	171
2000–2100	188	203
2500–2600	216	225
3000–3100	240	240

"In the non-union groups, machine miners earning less than $1300 receive daily earnings which range fairly progressively from an average of $7 to $8 per day. In the next two earnings intervals the daily average earnings amounts to $8.28 and $8.43 respectively. From $1500 to $2000 there is a range in average daily earnings between $9.06 and $9.90; in the five earnings intervals from $2000 to $2500 the earnings are $10 and over. Above $2500 the daily earnings average more than $11.

II. *Pick miners.* Based on 65,881 union and 59,856 non-union miners.

EARNINGS IN DOLLARS	STARTS MADE	
	Union	Non-union
500–600	80	92
1000–1100	139	153
1500–1600	180	188
2000–2100	211	206

"Pick miners' daily earnings increase gradually over the preceding interval throughout the whole range of earnings. In the non-union group pick miners shown working in the group less than 100 days had a range of daily earnings from $5.36 to $6. In the same extent of days and earnings no men in this occupation received less than $6 in the union fields. Continuing the comparison for the subsequent earnings intervals daily rates in the non-union field lag about $1 behind that of the union field."

III. *Loaders.*

EARNINGS IN DOLLARS	STARTS MADE	
	Union	Non-union
500–600	83	91
1000–1100	143	157
1500–1600	187	192
2000–2100	223	220
2500–2600	236	244

"All loaders who worked 130 days or over, in the union fields averaged more than $7 per day; in the non-union field $7 earnings began only for the loaders who worked 172 days or over. In the union fields the daily earnings for the men who stayed a short time on the roll is not lower than $6 per day; for the non-union group it is $5.75 per day.

"In all cases the daily earnings increase progressively as the earnings intervals increase or, to state earnings in terms of days, daily earnings increase progressively for tonnage men who have stayed a considerable time at one mine."

"The lowest daily earnings occur uniformly in the groups showing the smallest number of days worked. Thus in the union fields $7.14 is the average earnings per start of

the group making between one and two hundred dollars, and $7.81 is the average per start of those earning $3100 to $3200 and above, which group work 224 days or over. Thus the low average earnings per start shown in the lower wage groups indicate strongly that those in these groups are constantly changing from place to place or mine to mine to secure the opportunity for higher earnings, and that those who have the opportunity for the higher earnings seem on the whole to have been more steadily at work because of more satisfaction with their opportunities for earnings. The lower daily earnings in the non-union field extends to workers who have been on the rolls of the same mine a considerable number of days. Thus for all tonnage men in the non-union field a rate of $7 and above only begins with those who averaged 162 starts; while in the union field the $7 per start rate begins with those who have averaged only 107 days."

OUTSIDE DAY MEN

The following table shows the distribution of days worked by 29,552 union men and 40,409 non-union men in outside occupations. (These figures include boys as well as men.) "Boys were included in the figures already cited for day occupations. In the main, boys in miscellaneous day occupations were not indicated sufficiently in the original returns, to make accurate separation possible. The numbers employed in the bituminous mines are small however, except those working as door-tenders or trappers inside the mines. The total of these was 5570 or 2.3 per cent of all day workers. Time worked by the mine cannot be taken as an indication of opportunity for employment by day men. They have opportunity for work when the mine is idle. Some occupations afford comparative regularity of employment. Because of the difference between number of starts of the mine and the number of eight-hour days, the average days worked by day men is used to locate annual earnings. The interval that corresponds most closely to the average number of days worked is selected for each of the occupations." In instances where days amounted to over eight hours they were reduced to eight-hour days.

EARNINGS IN DOLLARS	DAYS WORKED	
	Union	Non-union
500–600	84	117
1000–1100	157	206
1500–1600	226	271
2000–2100	292	321
2500–2600	349	363

"There are 33 more days worked in the non-union field to earn $500, 49 more for $1000, 45 more for $1500, and 29 more for $2000. To contrast differently the time worked to make a given amount of earnings, it may be said that all men (2191) making $2200 and over in the union field have worked 312 days or more. This would mean a full-time working year of eight-hour days with no allowance for absence of any sort. In the non-union field all men (2328) making $1800 or over have worked more than 300 eight-hour days. In this

connection it should be recalled that men in the highest earnings classes make those earnings by reason of overtime or a long basic working day. All men in the union field earning $2900 or over are credited with more than 365 working days. In the non-union fields all outside men earning $2500 or over have more than 365 days. A number of these men have records that give them credit for 400 or even 500 eight-hour days."

A distribution of daily earnings of outside day men shows that "in the union group no outside employees are reported with earnings below $6.25 per day. The outside men in non-union mines average $1.75 per day less, since the lowest paid group is found making daily earnings of $4.50 to $4.75. The bulk of the outside men in non-union fields are found in the seven intervals below the $6.25 rate where earnings begin for outside employees in union fields. Only 1531 of the 40,000 non-union outside men earn rates averaging $6.25 and over."

INSIDE DAY MEN

Distribution of days worked by 63,683 union inside day men and 77,899 non-union inside day men

EARNINGS IN DOLLARS	DAYS WORKED	
	Union	Non-union
500–600	80	103
1000–1100	146	181
1500–1600	209	245
2000–2100	273	306
2500–2600	332	352

"Inside day men in union fields have a range of daily earnings beginning with $6.75 per day. With the exception of the short service groups, the largest number of men are found earning $7.25 to $7.75 per day.

"In the non-union field there is some concentration of numbers between $6 and $6.50 though the bulk of the employees are found between $5 and $6. A relatively unimportant number of men in the non-union field receive earnings of $7.25 per day or over.

"Inside men earned about $1 more than outside men in the same working time. For 185 days—the average for all day men in 1921—inside men earned slightly over $1400 in the union field. In the non-union for 200 days, the earnings were $1200 to $1300."

Earnings interval corresponding to average days worked by major outside occupations

OCCUPATION	UNION 185 DAYS	NON-UNION 200 DAYS
Blacksmiths	$1300–$1400	$1200–$1300
Carpenters	1300– 1400	1100– 1200
Engineers	1300– 1400	1000– 1100
Firemen	1200– 1300	900– 1000
Stablemen	1000– 1100	900– 1000
Laborers	1200– 1300	900– 1000

Earnings interval corresponding to average days worked by major inside occupations

OCCUPATION	UNION 185 DAYS	NON-UNION 200 DAYS
Brakemen	$1300–$1400	$1200–$1300
Bratticemen	1300– 1400	1200– 1300
Cagers	1300– 1400	1000– 1100
Drivers	1400– 1500	1400– 1500
Electricians	1400– 1500	1200– 1300
Motormen	1400– 1500	1300– 1400
Pumpmen	1300– 1400	1000– 1100
Timbermen	1400– 1500	1200– 1300
Trackmen	1300– 1400	1200– 1300
Laborers	1300– 1400	1100– 1200

LABOR TURNOVER IN THE BITUMINOUS INDUSTRY

This study was based on data which the Commission had available in the form of earnings reports on miners for the year 1921, and covers approximately one-fourth of the first rate mines in the industry.

METHOD

The information obtained from the earnings reports included separations from employment, complete separation or disappearances for the year, re-employments, and new hirings.

Although there are many ways of measuring labor turnover, the most common method used in industry today and the method used in this report, is to determine the ratio existing between separations and the average number of employees on the roll for the year. The disappearance of a man's name from the payroll for one month (two consecutive pay periods) constituted a separation. The average number of employees on the roll for the year was obtained by dividing the total number of man-pay periods worked by the number of pay periods the mine worked. "Stable force" may be defined as that group of individuals who were not separated from the roll during the year, as separation is defined in this study. It should be understood that separations of one or more single pay periods may have occurred among this group of men, but the stability was reckoned on the basis of an absence of two or more consecutive pay periods constituting a separation.

Mines which operated less than ten pay periods were not considered in the tabulation. The rejections resulting from this method were not many, however. It was determined also that wherever a mine suspended operations for one or more pay periods those idle pay periods would be disregarded. This consideration permitted the counting of a man's reappearance after a shutdown as constituting steady employment. It was found that by using the two-pay period separation as a basis for turnover little or no difference could be noted between mines working many pay periods and those working few.

FINDINGS

Although the turnover percentages range from 7 per cent in a sizeable mine in Northern Ohio to 459 per cent in a Northeastern Kentucky mine, the 99.9 per cent turnover for the industry as a whole does not appear to be greater than that which is accepted as the common experience in industries generally. The situation in the bituminous industry does not differ greatly from that in the anthracite industry of the same year.

A graphic representation of turnover percentages in union, non-union and mixed districts shows that the non-union districts undergo an alarming instability.

"The causes are probably many. In the first place it seems reasonable to presume that unionized districts lend security of jobs to miners. That is, discharge is more uncommon in unionized mines, because of involved union protection."

"The opinion of some non-union operators is that the men move quickly if work becomes slack and there is the faintest rumor of work elsewhere. The shifting rates of pay from mine to mine, probably induce some of this movement among workers seeking the best rate or the best working advantages.

"In any event, such high rates of turnover as exist in some of the non-union districts are certainly unhealthful from a managerial point of view. If organization morale, familiarity with the establishment, and settled community make-up have any value, the waste is certainly high in such districts as Logan where but 25 per cent of the mine work force is stable or steady throughout the year, and the turnover runs up to 230 per cent per annum.

"The mixed union-non-union districts of Tennessee and New River-Winding Gulf (W. Va.) present a peculiar contrast to the extremes of the union and non-union districts. The turnover percentage in Tennessee is shown as 122, and that of New River-Winding Gulf, 148. One non-union district has a lesser percentage than Tennessee and four less than New River-Winding Gulf. No union districts have higher percentages than these two.

"Within the districts, however, there do not appear to be any marked differences in the experience of non-union and union mines."

Another chart "shows a comparison of the percentages of stable or steady workers in the various districts. This, of course, bears a definite relationship to the turnover. As turnover increases, stable workers customarily decrease. It is therefore true that the union districts are more stable than the non-union. The actual range of stability is from 19 per cent for workers in the Kenova-Thacker district in West Virginia to 82 per cent for Michigan. The case of Michigan's unusual stability could perhaps be explained by the possibility that there is no competitive field of industry which would tempt these workers. In other words, it may be that there is no place for them to go if they decide to leave these mines.

"The range of stability in the recognizable non-union districts is from 19 per cent for Kenova-Thacker to 60 per cent for Westmoreland in Pennsylvania. The range of stability for the union districts is from 50 per cent for Fairmont (W. Va.) to 82 per cent for Michigan.

"Some comment should be made on the Westmoreland district because it stands out among the non-union areas with a high degree of stability among workers and a comparatively low rate of turnover. Westmoreland has a turnover percentage of 81, as contrasted with the 121 per cent for Somerset and 152 per cent for Connellsville, the other two non-union Pennsylvania districts. Its percentage of stable workers is 60, as compared to 48 per cent for Somerset and 42 per cent for Connellsville. There is nothing in the Commission's data to particularly account for this contrast.

"The study has shown some contrasts in the turnover among the occupational groups. For the 691

mines covered the percentages of turnover for the five occupational groups are as follows:

	AVERAGE NUMBER ON ROLLS	TOTAL SEPARATIONS	TURNOVER
			per cent
Machine miners	5,171	3,916	75.7
Pick miners	30,807	29,763	96.6
Loaders	39,891	43,825	109.8
Inside day men	30,874	28,534	92.4
Outside day men	14,646	15,032	102.6

"The lowness of the figure for the machine miners may be explained by the fact that this is preferred work and that earnings are probably better in this group. The loaders perhaps have the hardest task in mining, and this would explain in a degree the higher rate in this group. Some surprise may be occasioned by the fact that the turnover is greater among outside day men than inside day men. It has been something of a popular belief that men preferred to work above ground. This 10 point difference is not explainable from data available. It is of interest to note that the median percentage of stability in the 33 districts is 59 for inside day men and 65 for outside day men."

CONCLUSIONS

1. "The turnover for the industry as a whole is not remarkably high, as compared with other industries, although it is excessive in some districts.

2. "For various reasons labor is much more unstable in non-union districts than union districts.

3. "In mixed non-union and union districts the turnover percentage occupies a middle point between the extremes of the other two.

4. "The turnover among machine miners is noticeably lower than that for the other two tonnage worker groups, pick miners and loaders.

5. "The turnover is higher among outside day men than among inside day men, although the stability is greater in the first group."

LABOR RELATIONS IN THE BITUMINOUS INDUSTRY

The section of the Commission's report dealing with labor relations in the bituminous industry "is mainly the result of an inquiry into day to day relations between operators and miners, the factors that more immediately affect those relations, and the procedure that governs them. It is, in addition, a study of some of the larger issues between employer and employee that come up in connection with the renewing of agreements and give rise to the danger of a national strike.

METHOD

"The study rests primarily on field investigation. Investigators experienced in industrial relations were sent to learn by direct contact with operators and miners in the field and inquiry from them and their representatives the manner and spirit in which relationships function from day to day. Investigators were charged especially to discover the wholesome situations that by example could be made the basis of progress."

"After a number of preliminary interviews, a full outline was worked out in coöperation with the field investigators, covering the points on which information was to be sought. This outline was designed only for the guidance of the investigators and was in no sense a schedule. On the contrary investigators were asked to include in their daily and their final reports complete details of all interviews and any relevant information, regardless of details of the outline. The reports were checked by other material in so far as this was available. But the main assurance of accuracy lies in the character, ability and experience of the investigators."

"The investigators spent the greater part of the period from March 15, to June 15, 1923 in the coal fields, interviewing owners, higher executives, superintendents, foremen, labor commissioners, union officials,—international officers to pit committeemen,—and individual workers, attending union meetings, operators' meetings (where such existed) and sessions of the joint adjustment machinery. Particular attention was also given to this joint adjustment machinery which has been set up in most of the districts; and especially to the way in which provision is made for decision by neutral arbitrators of questions which are referred to them from time to time by the parties when they are unable to agree. Each investigator was free to plan his own work and there was some variation in method, but in all cases the interviews covered the district president of the union, some of the sub-district presidents, and executive board members, in addition to numbers of local officials. The company interviews usually included representatives of all the larger companies in each district, and others that stood out for successful or unsuccessful, or indifferent labor policies. The representatives of the operators' associations were always interviewed. In the non-union districts contact with representatives of the workers was more difficult, but in these regions special effort was made to reach numbers of individual workers. In so far as was possible, an attempt was made to see representatives of the workers at every mine visited, or to talk with the district officers and operator official concerning relations in that mine. In general, statements of one side were checked and compared with statements of the other. Many persons on both sides were interviewed more than once and frequently the interviews were prolonged.

"The work of the investigators was supplemented by a number of other conferences and interviews, by members of the Commission and staff. In all approximately one thousand persons were interviewed at least once."

SCOPE

"Intensive work was done in Illinois, western Pennsylvania, Oklahoma, Arkansas, Kansas, eastern Kentucky, northern West Virginia, Somerset County, Pennsylvania, Alabama, and the state of Washington. Less extensive study was made in Ohio, Indiana and southern West Virginia.

"No attempt was made by the Commission or its investigators to study labor relations in the field in the mines of Tennessee, central Pennsylvania (except Somerset County), and some minor producing fields. The output of most of these, with the exception of central Pennsylvania, is small, and, separately they do not present a major problem. All of the Western states were visited in person by a member of the Commission whose observations were made available for this study."

COMPLICATING FACTORS

The Coal Commission's study of labor conditions in the bituminous industry took into account those factors which are necessary for completeness in so complex a problem. Some of the more important of these factors are physical conditions, transportation facilities, the freight rate structure, market conditions, types of companies and of working force, community conditions, organization of operators and of workers, and industrial relations.

The physical conditions found in different fields and in different mines of the same field vary to wide extremes. In one of the Ohio districts veins fourteen feet thick are found, and machine mining is employed almost entirely, while there are veins worked in adjacent mines in which not even low coal equipment can be used. The formation of the strata in which the coal is embedded also affects ease of removal.

Regularity of operation of mines is affected directly by transportation facilities and the freight rate structure. Some districts are served by only one railroad and cannot produce to capacity, while others are served more adequately by several railroads and river transportation. The complex freight rate structure is a constant subject for complaint, for it affects the development of new mines, the car supply of mines already in existence, and the marketing of the product.

Due to competition and the overdevelopment of the industry, market conditions are noticeably affected by accessibility, competition with other coals and fuels, and market organization in the company.

Diversity of types of companies in the coal industry is great. There are four primary types: commercial companies which sell their product under contract, companies which sell in the open market, consumer-owned companies, and small mines known as wagon mines or snow-birds. But examples may be found of various combinations of these types.

"Differences in the racial composition of the working force and in the community conditions under which the workers live make for marked differences in the nature of the problems of labor relations in different sections of the country. The Commission's study of living conditions shows that in West Virginia, Indiana, Illinois, Ohio and other central western States, native born white Americans predominate, in Pennsylvania, over 56 per cent are foreign born, while in Alabama over half (53 per cent) are colored.

"The extent to which the mine workers live in incorporated towns

shows similar variations. In Illinois 47 per cent live in towns of 2500 population or more, while in West Virginia only 6 per cent live in incorporated towns of this size and bituminous mining generally involves living in company controlled communities.

"The organization of the operators and the workers are discussed at length in later sections of the report. The operators have no national organization uniting the entire group of bituminous operators. The largest organization does not deal with labor matters. The workers are organized into the United Mine Workers of America, which includes approximately 400,000 out of the 660,000 bituminous miners in the United States. The strength of the union in the different districts plays a large part in determining industrial relations there.

"Organization is complete or substantially complete in Illinois, Ohio, Indiana, Iowa, Michigan, Missouri, Kansas, and Montana. The union has included two-thirds or more of the workers in Wyoming and Utah, Oklahoma, Texas, and Arkansas, and Washington, something over one-half the workers in Pennsylvania, about one-third in Kentucky and Tennessee, most of them found in Tennessee and western Kentucky, one-fourth in West Virginia, most of them in the Fairmont district, and the union has no members or only a negligible fraction of the workers in Alabama, Colorado, Virginia, Maryland and New Mexico."

ORGANIZATION OF LABOR RELATIONS

"In the strong union districts, relations between the workers and the operators are usually determined through collective agreements. A feature of the agreements in all districts is the institution of joint adjustment machinery, consisting of a pit committee elected by the workers at each mine to take up disputes with the management, and more elaborate machinery for deciding disputes on which the committee and management can not agree. In union fields labor relations are governed (a) by the agreement (b) by the decisions under the agreement and (c) by custom which governs matters not covered by the other two.

"In non-union fields there is relatively little attempt at special organization of the relationship. Typically the individual worker deals with the foreman and if he is not satisfied is theoretically free to carry his complaint to higher officials of the company. In some companies however, plans of employe representation have been organized with machinery for the adjustment of disputes similar to that found under union agreements."

Relations between employer and employe in the industry have been marked by frequent strikes. These include strikes brought about to secure a union agreement, suspensions occurring at the expiration of an agreement due to failure of acceptance of renewal, and local or

petty strikes based on a minor grievance, frequently within a period during which relations were governed by the terms of an agreement, in which cases they were in violation of the agreement.

Time lost by strikes during the period 1899–1921 was only 9.8 per cent of the total idle time.

In the report on Labor Relations in the Anthracite Industry, reference is made to the partisan propaganda published by both operators and union. The gulf that separates the publicly expressed mind from the actual mind of the industry is greatly enlarged in the case of the bituminous industry. Of course, little of this militant propaganda is constructive or relevant to the main object of securing wholesome and efficient industrial relations in either the union or non-union branches of the industry. It creates the erroneous impression that all operators are of one kind and that all members of the union are of another kind. "Such an assumption does great violence to the facts, and is a barrier to progress. The first step toward better relations in the industry is to discover those forces and persons on either side which are constructive and those forces which do injury to the cause of good relations. It is necessary, therefore, to identify the major types of operators and the major types in the union as expressed by their attitude towards each other and towards their joint relations."

ATTITUDES OF OPERATORS

"In view of the many forces that operate in an industry as complex as coal mining, and of the varying temperaments of different men, a variety of attitudes on labor relations is inevitable."

Although not separate and distinct, four major classes of attitudes may be distinguished among operators. The attitude of adjustment through constructive management of labor relationships based on mutual confidence and understanding is characteristic of a group who may or may not deal with the union; but where the union is dealt with the operator feels that the annoyance and limitations often felt by him are more or less offset by the larger measure of industrial peace. "This group of operators is not continually *thinking* about the union. It is not to be assumed that these men do not resent the tremendous power of the United Mine Workers, the limitations and restrictions placed upon management, the petty grievances that are sometimes presented, the occasional uncalled for and unprovoked stoppages and the necessity of exercising patience in breaking in new union pit committeemen, and local and sub-district officials. They do. But they devote their energies and thought exclusively to operating with profit, under present conditions, and there is no profit in resentment. On the whole, they realize the desirability of a union strong enough to keep less advanced operators in line, and many of them would be unwilling to go back to old conditions. Nor can their attitudes on the whole be termed one of complacency. One needs to be in the field for some time meeting

all manner of men on both sides, under all manner of circumstances, in order to appreciate the full significance of this remarkably intelligent and business-like attitude. The aim is to secure the lowest possible operating cost under the agreement, and the labor policy is shaped to this end.

"The basic article in a labor policy directed toward this goal is to secure and maintain the confidence of miners and of union officials. This policy is maintained because of its operating value, in securing the coöperation of union officials in enforcing the terms of the agreement, and in preventing the losses from retaliation through "spite" stoppages and through overcharges on dead work. Managers and face bosses are selected with reference to their ability to handle men, and are sometimes even trained in the preparation of cases to be taken up in the "courts" of the industry.

"Men who follow the policy embody with their business sense an instinctive sense of fairness. A marked feature of their practice is the degree of sportsmanship it has developed, not only in the operators themselves, but in the miners and union officials with whom they deal. Keen bargaining rather than quarreling dominates their conduct, and decisions are accepted with remarkably good grace."

The attitude of adjustment through "peace at any price" is apparent in some cases where "operators prejudice their own position and compromise the position of other operators by yielding to the union points specifically reserved under the agreement to operators. This arises in consequence of the policy frequently adopted by the union of regarding the agreement as a minimum guarantee and of trying through constant or intermittent pressure on individual operators to get all they can above it during the agreement period. In the face of this pressure, "peace at any price" operators yield first this point, and then that, until enough precedents have been established to make it difficult for operators sincerely desirous of maintaining the terms of the agreement to do so. The "peace at any price" attitude may arise from a lack of backbone or a lack of financial strength on the part of the operator. It may arise as a consequence of the cowing of operators by the autocratic and agreement-ignoring pressure of a very powerful local union. It may arise also from the temptation to take advantage of the profits offered by a favorable market—a fact which makes the number of operators of this type increase during a period of prosperity. In fact, each depression period sees operators in a union field trying to win back many conditions that they had yielded in disregard of the agreement but under pressure of the union during prosperous times. Certainly the absence of a strong central organization of operators makes it more difficult to put courage into operators of this type."

The "resentment" attitude may take the form of sharp or clever dealing, frequently in violation of the agreement and at the cost of long-run good will: or it may take the form of "force." In fields of differing degrees of organization this atti-

tude expresses itself in different ways. In the union fields the company tries to "get even" with the union, and in the strictly non-union fields force is used to keep the union out.

The attitude of "no policy" is present in many companies in the bituminous industry, just as it is in many other industries. The policy of the company may be changeable, or may depend on the views of individual foremen and superintendents. Laxness may prevail for long periods, but may at times disappear with the rigid enforcement of some policy, new or old.

ATTITUDES OF UNION MEN

In the union there were distinguishable five important attitudes. These were discovered through interviews with operating officials, union officials, rank and file, and neutral citizens, supplemented by a study of the public documents of the union. The predominating attitude found among the leaders in the older unionized fields, as well as many of the international officers of the United Mine Workers of America, is that of responsible business unionism. This attitude is characterized in the Commission's report as follows:

"It is practical, concerned with immediate objectives, seeking 'more here and now,' generally content to press the claims of the workers without concerning itself over ways and means of meeting them, willing to leave to others plans for the better organization of industry. The leaders and members in this group believe in the maintenance of the agreement exhibiting, on the whole, a rather keen sense of responsibility for the union share in its administration. However agressive they may be in demanding changes when a new agreement is being negotiated or in organizing a non-union territory, they are, on the whole, not difficult to work with within the agreement period."

The attitude of irresponsible business unionism expresses itself in "getting away with" anything that is possible, and disregards the future effect of such a policy on unionism and on the industry.

The attitude of insurgent business unionism is shown by a considerable number who "are primarly characterized by a resentment against the particular conditions under which they work and live. It is, therefore, a protest group. The unrest may arise from great irregularity of employment, from dissatisfaction with the management of the union, from resentment against provocative acts of management, and many other specific grievances. Members of this group may be either responsible or irresponsible, according to the extent to which the conditions against which they protest are disregarded. When these conditions are removed, this group is likely to find itself under one or the other of the two groups mentioned above. It is interesting to notice that the general testimony of operators is that these so-called "radicals" are most often led by native Americans. In fact, some operators adopt the policy on this account of keeping the Americans in a minority."

The attitude of the self-seeking labor politician is that held by the leader who is interested only in serving his own ends. "This attitude ranges all the way from the attitude of the out and out labor demagogue to a mere consciousness in the minds of ordinarily responsible leaders which colors the background of all their acts."

The attitude of the philosophical revolutionists is held by "those who believe that there is something fundamentally wrong with the present organization of industrial society and whose interests lie in making plans for its re-organization. They may or may not be interested in minor improvements as a stepping stone to something better. They frequently are unable to outline the steps by which their program is to be converted into action or to define clearly the form of their ideal society. There are not many leaders with the attitude of the philosophical revolutionist within the United Mine Workers at the present time; where they exist, they are likely to be anti-administration."

"Within the industry all the workers whose attitude is not that of responsible business unionism are known as radicals, and are condemned as such by operators and "regular" unionists alike. There is no necessary connection between the different groups, except that they all represent attitudes that flourish where conditions are least satisfactory. Frequently, too, they will make common cause against leaders dominated by the attitude of responsible business unionism.

"Taking the union as a whole the attitude of responsible business unionism predominates. But the discussion of the various attitudes found has indicated the impossibility of a broad generalization on the subject. Both constructive and destructive forces appear within the union as among the operators. The presence of the destructive forces is particularly ominous because of the lack of education and experience of the great body of workers and local leaders in the industry."

LIMITATION ON OUTPUT

"It is claimed that men do not work as hard under union conditions as they did formerly when the fear of discharge was a more powerful stimulant. This statement is difficult of statistical proof. Many if not most of the operators interviewed believe it; many on the other hand thought there was little difference between the union and non-union worker in this respect, and a few reported they could get greater production under union conditions. In any case, there would still remain the question of possible social or physiological benefits from any lessening of work.

"It is claimed that certain working rules which the union has succeeded in writing into agreements or enforces as matters of custom, result in artificial limitation of output. Most complaint is made in regard to the requirement of a "square turn," the limitation of the number of loaders after a machine, the requirement of a certain number of railroad cars on the tipple before going to work in the morning, and

the rule against some one working the place of an absentee.

"The 'square turn' rule apparently causes the most trouble. By the 'square turn' is meant an equal division of the opportunity to work among all the men in the mine. Usually it is applied by the distribution of mine cars. The 'square turn' means that all miners must receive the same number of cars per day, and is enforced in an attempt to prevent discrimination and the petty graft which could go on if mine cars were distributed at the option of the foreman. Standing by itself the equity in the claim for substantially equal opportunity is clear. Its enforcement in the form of the 'square turn' may mean restriction of production if the car supply is limited and the miners in some places are not able to load all the cars furnished them. On the other hand it need not mean restriction if every car that is distributed is loaded."

"In many places there is the unwritten rule that in case of the absence of a miner, no other miner shall be allowed to work at his workplace. This rule is partly an expression of the feeling of proprietorship which the worker develops in his room, and partly a rational precaution, as the worker is responsible for the safety of his working place. . . . . In a few union mines this restriction is disregarded and squads of men are maintained for the purpose of filling the work-places of the absentees of the day."

"Complaint is also made that the union objects to the introduction of machinery. The official position of the union is just the reverse, as the officers have repeatedly gone on record in favor of its introduction, but they have at the same time demanded that the workers receive a share in the savings brought about by the machine.

"In practice there is often difficulty, usually with local unions, over the introduction of machines. This is due in part to the habitual human conservatism that shrinks from anything which upsets accustomed routine. It is also in part due to a fear that new machinery will make work that is already irregular still more irregular.

"The form of opposition to machinery varies. Occasionally locals will go out on strike against the introduction of a new type of machine, but more frequently they prevent its introduction by failure to agree on a rate. There have been cases in which the local was apparently 'stalling' rather than actually bargaining over a rate."

"No discussion of restriction of output would be adequate unless the parallel problem of restriction of output by operators were also mentioned. It is conceivable that as labor may seek to increase the return for work by holding back, so also under certain conditions may management by restricting output seek to increase its return. In a competitive industry, like bituminous mining, there is little probability of reward attending any such action by an individual operator. At times of negotiation when the market is crowded with coal a willingness to let the negotiations run into a strike in order that

the advantages of a seller's market may be created is not inconceivable. We have not discovered any tangible evidence of such policy. The consciousness on the part of operators in union mines that such a policy would redound to the advantage of their non-union competitors, makes it doubtful whether the gains in price following such a strike would be enough to offset the losses incurred.

"Closely related to the problem of limitation of output are the problems of attendance and short hours. The operators charge that the men will not work steadily even when there is opportunity to work. They claim that the absence rate is very high and that the men do not work the full day called for in agreements. But about half of the operators interviewed indicated that they felt that the absence rate was not excessive. This attitude is partially confirmed by the study of attendance made for the Commission by Dr. Horace B. Drury. In other words, the tendency towards high absence is less than is frequently asserted. Many cases were reported of miners moving from an irregularly operating mine to find a steadier job. Many mines report that they have ceased keeping track of absentee records because the problem is much less serious than it was two years ago. As a whole, however, the absence rate is rather high and is greater than in most other industries. Unfortunately, very few reliable records of causes for absence exist in the industry.

"Some of the factors which encourage irregularity and short hours by the miner are: The ability of men to earn a fair wage in many areas if they work less than a full week; the desire to limit earnings for fear of their effect on wage reductions; the desire to effect an even distribution of the opportunity to work in order that all may share alike; the irregularity of mine operation tending to develop the habits of the casual and intermittent worker."

DISCIPLINE AND DISCHARGE

"The coal miner is more independent in his work than is the worker in almost any other trade. The very nature of his occupation, which necessarily involves an absence of close and continuous supervision, leaves him to vary the cycle of his operations as he desires so long as he conforms to certain general regulations. Questions of discipline, using the term in a negative sense, therefore center about disputes over these regulations or over cases arising under them: The most frequent disputes concern the loading of rock or other impurities with the coal, poor attendance including early quitting (i.e., quitting before eight hours have been worked as provided for in the agreement), insubordination, and, in the non-union fields, membership in, or suspicion of sympathy with, the United Mine Workers of America.

"In the union districts, the agreements usually contain some provisions defining the 'right of discharge.' The provisions vary but in general they provide that the right to discharge and responsibility for discipline rest with the employer, but add qualifying clauses which provide against 'unjust' discharge and for

review by the adjustment machinery. Complete freedom of action on the part of the employer is further restricted by clauses prescribing the penalties for certain infractions of the regulations, such as for loading dirty coal and for absence of more than a minimum number of days. Discipline in the form of fines is specifically provided for breaches of the contract by strike or lockout. The fines are collected by the operator, the amount collected being usually turned over to the district treasury of the union, to the operators' association, or to the Joint Board.

"Actual practice bears considerable relation to the provisions in the agreement, but varies under these provisions from field to field, depending on the strength, wisdom and responsibility of the respective operator and union organizations and of the joint adjustment machinery. The outstanding fact is that discharge and other disciplinary action by the employer is very much more difficult than formerly."

"In the union fields the present agreements if properly administered afford a reasonable protection for the interests of both parties. In the non-union fields there is no such protection. Many operators have yet to recognize that a worker has a real interest in security of tenure, and many fail to realize that a discharge policy may be such as to invite unionization much more effectively than armed guards may prevent it.

"Discharges in well managed industries are surprisingly few; they present a problem which can be met without extraordinary difficulty."

JOINT ADMINISTRATION OF LABOR RELATIONS

"In the bituminous coal industry joint adjustment machinery has long been a feature of unionized areas. The machinery varies from district to district but it has common features particularly in regard to the first steps in the adjustment of a dispute.

"Every union agreement provides for a pit committee elected by the local union from among the workers at the mine, to take up with the management disputes that can not be settled by the individual worker and the foreman. If the committee can not settle the dispute with the management, higher union officials, such as the sub-district president, the district executive board member or the district president, are called in. They then take it up with either the individual company, or the representative of the operators' association. In some districts the case may go up through the entire union organization,—subdistrict president, board member, district president, and from individual company to operators' association.

"The handling of disputes which fail of settlement through the procedure just outlined varies as between the different districts. Following are the principal provisions found for dealing with such cases:

(1) No specified procedure. This is the situation in the greater part of the Ohio field. In the absence of other available procedure deadlocked cases are sometimes referred to the international officers of the union.

(2) Reference to a joint board composed of an equal number of repre-

sentatives of the two sides, without provision for resolving a deadlock in the joint board. This holds in part of Ohio, Indiana, Pittsburg (Pa.) district and South West.

(3) Reference to a joint board with subsequent reference in case of deadlock to an umpire selected jointly to decide the particular issue. This holds in Northern West Va.

(4) Reference to a joint board with arbitration of deadlocked cases by a continuing arbitrator or board provided in each case the two sides agree to such arbitration. This holds in Illinois.

(5) Reference to a joint board with subsequent obligatory reference of deadlocked cases to a continuing arbitrator or board. This holds in Central Pennsylvania, Tennessee, Iowa and Michigan."

"The duties of the joint operator and union machinery are three fold.

"It acts as a court to secure for individual workers or individual companies their rights under the agreement.

"In connection with deciding individual cases it necessarily interprets the agreement.

"It provides the agency through which continuous bargaining may take place on subjects not specifically covered by the agreement.

"Our inquiry indicates that on the whole the machinery for adjusting disputes works with fair efficiency. Little complaint was heard of undue delays and in only one district do we find evidence of serious unwillingness to use the machinery set up by the agreement. But it functioned better in some districts than in others. In those districts where no provision is made for a final settlement by neutral persons in case the representatives of the two sides failed to agree, we find that cases of deadlock have frequently led to strikes. In other cases, the practice of referring questions for final settlement to the international officers of the union has not made for mutual satisfaction or for impartial interpretation of the agreement.

"Many operator officials and many union officials favor the continuing arbitrator feature as a reasonable and wise influence for stability. The operators see in it the only guarantee against direct action in the form of illegal strikes by the miners, and the union officials who favor it say that it speeds up the settlement of cases. Having cases hang fire, they find, leads to restiveness on the part of miners concerned. Besides some union men have recognized that impatience due to inability to dispatch business is likely to influence wavering employees toward trying to go non-union."

Although there is no national organization of operators for the discussion and development of general labor policy, such as that maintained by the union, yet a constructive step has been taken by the bituminous operators in almost all union fields in the establishment of the office of Labor Commissioner.

"The labor commissioner is usually charged with at least several of the following duties:

"Negotiation with the union officials of the settlement of disputes which the local mine officials and local union officials have been unable to settle.

"Presentation of cases before the Joint Board or Arbitrator.

"Advising individual operators and their executives concerning policy,—in general and in respect to proposed action that might cause disputes.

"Development of constructive labor policies based on complete information for the group of operators.

"Direction of the labor publicity of the association so that it may contribute towards good relations and not detract from them.

"Taking any other steps that will forward effective and constructive management of labor relations by operators.

"Few commissioners perform all of these functions and in many cases they are not men who have a sufficiently broad viewpoint concerning the agreement as a whole and the equipment required for administering it wisely to enable them to qualify as advisors on fundamental labor policy. Moreover, we find that the time of these men is so fully absorbed by the task of handling cases already in dispute as to preclude, except to a limited degree, work of a preventive sort. There are a few notable exceptions and in general the existence of the office constitutes an important foundation for further progress. The office of labor commissioner is a recognition that the policy of the group should be reasonably consistent and that it cannot be so unless responsibility for consistent policy and practice is centered in one person representing the whole group."

TRAINING OF MINOR OFFICIALS

A majority of companies are so organized that superintendents, foremen, and assistant foremen play a large part in making labor relations amicable or militant. These minor officials are close to the men from whom the complaints arise and their actions in such situations determine to a large extent the larger problems of labor adjustment. Where a "boss" is properly trained or is naturally adapted to handle complaint situations good relations were invariably found. This subject is treated at greater length in the report on *Labor Relations in the Anthracite Industry.*

PUBLICITY OF FACTS

"Half-information on topics of mutual concern ranks high among the factors that tend to mar relations. It has always been a ready activity of the human race to build stories out of whole cloth to account for this and for that, in order to delight that dramatic instincts. However the practice may be condemned, the condemnation must be left to others, for all of us come under the indictment. The cure is at hand,—slow to be sure, and difficult. In its early stages, industry assumed that secrecy was to it as essential as air to the flowers. Since the early days, some of the unwholesome growths of rumor have combined, with some clear common sense, to make the value of secrecy somewhat less. Just how full should be the information given by employers to employes at any moment is a question to be debated with regard to each case. Fundamentally, it would probably be accepted in any state of affairs that a beginning towards full and complete information of the company's business should be made, and that this beginning should

be carried along with an open mind as far as conditions seem to warrant at a particular time. Experience in other fields has shown that the more the truth of the company's activities is given out, the clearer it seems that it is of great value, and that the advantages from secrecy have been overrated. One coal company's officials interviewed found it of great value to publish every month to the men a statement of their costs and profits; another company reports that its employes are most interested in information concerning orders received."

"Irregularity of employment offers another field for such common constructive education work by the management. The miner frequently assumes that the operator's purpose in shutting down a certain mine for a time is an ulterior one. At times the purpose might not bear examination, but there is enough trouble for the miners and for the industry over irregularity of work without having half-information needlessly adding to irritation and suspicion.

"Operators point out that a policy of full information and explanation facilitates innovations by management, which would otherwise be opposed, since the miner (in common with most other people) is inclined to oppose any innovation that interferes with his customary routine. Operators point out that the introduction of safety lamps and permissible explosives, which were for the miner's protection and of which he eventually strongly approved, have led to petty strikes in violation of the agreement, when they were introduced without previous effort to explain their use and purpose and to meet the objection of the miner.

"Such illustrations might be added to without end but they clearly establish the fact that where contacts between management and men are confined chiefly to grievances, the opportunity represented by all the normal forces that make for coöperation is being neglected. One very fundamental need in the coal fields of the United States is that management and men should come together more often on occasions when there are no grievances with which to struggle. Men, or groups of men, who meet together only in conflict, or in the atmosphere of complaint and fault finding—which in spite of all possible courtesies must lie behind grievances—cannot expect entirely to avoid some sort of critical attitude toward each other. Since it is of primary importance that grievances should be promptly, frankly, and thoroughly threshed out, the only way to meet this fundamental need is to devise ways for management and men to get together for constructive purposes. It must be recognized that it is not easy to work out from the habits of complaint, and that time and a carefully planned course are necessary for success.

"One of the most practical devices, which has been successfully used, is to organize a Safety Committee and expand its work slowly into related fields of mutual interest. To some extent, joint committees on recreation, athletics, and the like have served as a starting point for joint consideration of questions more directly connected with business; but to the men an

appropriate Safety Committee is likely to be more suitable as a basis for successful extension of the discussions into other fields of mutual interest."

"It is noticeable that the inquiries of our investigators in the field brought out almost no examples of pensions to superannuated employes. In industry pensions are widely accepted as an investment, paying reasonable returns through the release of employes from the dread of old age dependency; and through the freedom it offers to the management to lay off those who through age become a clog upon the organization, without the ill-will which develops when old and faithful employes are laid off without sufficient means of support. Among the few cases observed where pension systems had been established was the following case of one company which has established an old age pension scheme of which both the company and union officials speak with praise. The miner pays in a few cents each month—which sum the company matches. A man must stay 10 years with a company before coming eligible under the scheme. A beneficiary now nets about $15.00 a month; but as the fund accumulates, monthly payments will be larger. A union official, commenting on this plan, pointed out that he knew of cases in which this scheme had aided old miners to live their last years in comparative independence. This official favored the plan although he fought it until he understood it."

OPPORTUNITIES FOR CITIZENSHIP AND SELF-GOVERNMENT

No one can pretend that the problems involved in running a mining camp on private property are easy of handling; especially where streets, schools, churches and grave yards are all owned by the operator. The owner put in this position is called upon to exercise more different kinds of real ability than commonly reside within a single brain. One angle of the question has a very deep national interest. We have long proclaimed the desirability of our permanent immigrants becoming citizens. The sense of participation, the sense of responsibility which goes with citizenship are steadying and unifying influences. In the private mining camps even men born in this country are without any opportunity for citizenship. No matter how well governed they may be, they cannot be self-governed. While the cure for this evil is not obvious, at least it is incumbent upon the owner never to rest in his attempts to cure it, and to continue taking such steps of progress as will eventually result in citizenship. Complete paternal authority cannot exist in the American Commonwealth long without forming a source of irritation and infection to the whole body.

"Even where the mining camp is not completely owned, there are thousands of cases where migration is just frequent enough so that miners seldom remain long enough to become voters."

EMPLOYEE REPRESENTATION IN NON-UNION MINES

"The experience of the coal and other industries seems to indicate that it is probably true that the very foundation for permanent peace in the industrial world is in some form of representation. The union in the union fields offers an opportunity for miners to have something to say about the conditions under which one lives his working life. Temporarily, a non-union mine by holding to or bettering standard union conditions, may build up a passable morale among its men; but permanently is this likely to persist without providing some measure of representative government? Herein lies the real significance of mine councils, and the reason for the union's fear of them. They offer the possibility of a competition much more solid and substantial than anti-union conditions can long offer without representation. What they, in themselves do not offer, in any form as yet devised, is the same measure of permanent security for the employe as is offered by the union. So long as both unions and mine councils exist, the one would provide safety against the backsliding of employers into exploitation; while the other concentrates on the development of new methods of active coöperation, and seeks to build up a constructive partnership which has the possibility of furnishing a challenge to and competition with the union.

"Attempts to establish some form of employe representation are not numerous in the non-union field. A few experiments have been tried and the essential elements in one of these may be presented as illustrative. Provisions for administration of this plan, —the most completely representative system found, were briefly as follows:

"An Employes' Committee for each mine consisting of three employes elected from and by the employes of the mine.

"An Employes' Commissioner selected and employed by the employes, who shall devote his entire time to the interests of the employes.

"An Operator's Commissioner selected and employed by the operator, who shall devote his entire time to the interests of the operator.

"A Joint Board of Review consisting of three employes and three officials of the operator.

"An Umpire."

"It should be recognized that all such employe representation plans in this industry are fundamentally the product of the existence of the union, just as much as are the agreements in the union field. If such plans were to be the sole means of miners dealing collectively in all union fields, their fundamental limitation would be that they failed to recognize that the competitive nature of the coal industry has been such as, in the past, to lead to depressed standards. Some such external force as the union, approaching a monopolistic character, was necessary to offset this tendency and force an elevation of standards for the miner. Moreover, employes organized only into employe representation plans in individual plants and not connected in any way are not in a position to work most effectively towards the solution

of problems that are common to the whole industry, such as irregularity of employment. But with a strong union, having over two-thirds of the miners in its membership, these defects are somewhat reduced because the existence in the union fields and the potential existence of the union in the non-union fields, tend more and more to hold standards nearer the union level. It is true that they at times fall much below the union level, but not in the degree they once did. Such employe representation plans may tend to afford a competition for the union that will make for a healthy elevation of the coöperative standards of the union. But the non-union operators who install such plans will succeed only through the competitive appeal of real standards based on an understanding psychology, and not by the use of force. Such a state of affairs implies the continued existence of a strong union, and the competitive force of its potential presence if non-union standards are to be maintained on a level approaching that of the union fields, supplemented by continuous publicity of rates in the non-union fields already suggested."

GOVERNMENT OWNERSHIP NOT NECESSARY

"Although conditions in the coal industry do not, on the whole, compare favorably today with those in other industries, we do find constructive forces on the side of both the operators and the miners. We believe the forces that make for more acceptable service should be given opportunity to mould policy in the light of the Commission's findings before the Government seriously considers so fundamental an experiment as taking over and operating the mines. This report is presented with the hope that suggestions it contains may help to point the way to better relations and to such service to the public under a system of private operation, that resort to public ownership may be unnecessary. Above all it is hoped that both the operators and the mine workers may be stimulated to thorough and open-minded study of the situation and to take such an account of stock as will enable them without sacrificing their own legitimate interests jointly and severally to measure up to public requirements."

Measurement in Vocational Selection

An Outline of Research Procedure

(Concluded)

By Max Freyd, *J. Walter Thompson Company, New York*

IV. The Measuring Instruments in Use

H. Demonstrating the Value of the Measuring Instruments

A CERTAIN amount of salesmanship is necessary in addition to the calculation of correlation coefficients if the experimenter wishes to see the results of his study put to use. His case must be presented from two angles. He must show, first, that the selective method he has devised has greater predictive accuracy than the methods hitherto in use by the firm, and for this purpose he must make some evaluation of the other methods. The older methods may have greater accuracy and reliability than the test! He must show, second, that there is an economic saving to the firm in the use of the tests. The experimenter may satisfy himself that the tests will help the individual as well as the firm by keeping him out of occupations for which he is unfit. The experimenter may also satisfy himself that he has collected material which may be of value in the vocational guidance of children and young people.

1. Their relative predictive accuracy. The selective methods in most common use in industry are of two sorts. They depend either on impressions gained from a personal interview or on the use of one of the many pseudo-scientific methods. In either case it devolves upon the experimenter to make some evaluation of the accuracy of prediction by these methods. He should employ the same rigorous procedure as in the evaluation of the tests and evaluate these methods with regard to the same criterion of success. Only under these conditions can comparisons be made. If each applicant is interviewed several times before final action, the judgments of interviewers may be compared with each other. In most instances a wide disagreement will be found, which opens an opportunity for emphasizing the greater objectivity of tests. In this connection it may be suggested that no claim be made for the exclusive use of tests. The interview is valuable for the elimination of individuals who are obviously unfit for the vocation because of characteristics not ordinarily measurable by tests. Interviewers, however, should be provided with rating scales for judging applicants. Then the interview and the tests supplement each other.

The experimenter will find it a wise procedure to present in graphic form the results of this comparative evaluation (12, 57, 41). A simple sort of graph should be used, one which brings out forcibly the true relationships. Distribution curves of successes and failures in the tests with the use of distinctive symbols are probably the most effective. Some method may be devised for showing simply and forcibly the per cents of successes selected and failures eliminated by the various methods of hiring. The experimenter will have to overcome the force of the individual exception who stands out as a contrast to the others and who assumes exaggerated importance in the estimation of executives. This may be done either by showing the executive the value of mass results, or by citing outstanding cases of accurate selection by the use of tests.

2. Their economic value. The experimenter will encounter more difficulties in obtaining data to show the economic value of the tests to the firm. If greater accuracy of prediction is possible through the use of the tests than through the customary methods of selection, the saving to the firm may be obvious to the experimenter. But he nevertheless must compute or estimate as accurately as possible how much, in the course of a year, this saving will be. Perhaps the economies through improved selection will, in some instances, not be found to equal the cost of installing and administering the tests. Sometimes, on the other hand, these economies will prove to be so large as to seem incredible at first. In either event, the facts are essential. The research worker scorns uninformed opinion as to the reliability and the validity of selection methods, old and new. He should likewise be impatient of mere hopes or vague impressions regarding their relative cost and money value to the firm.

After computing as closely as possible the additional expense involved in installing and administering the new measurement methods, the experimenter should undertake, with the help of the cost accountant and other executives, to make dependable estimates of probable economies to be effected through their use. He should try to obtain actual figures on the saving on these items:

Advertising. This is commonly newspaper or magazine advertising in the "Help Wanted" columns, and must be stated in terms of the cost per successful employee obtained.

Correspondence. The cost of correspondence with applicants in distant localities is another expense. It includes as its largest item the appropriate fraction of the salary of the executive who has to give time to this correspondence.

Traveling expenses. This item may be either the traveling expenses of the applicant to the place of employment or the expenses of the interviewer to the place of residence of the applicant.

Salary of interviewers in excess of those necessary with the use of the tests. Some consideration should also be given to the cost of the time devoted by the foreman to interviewing men.

Office overhead. This will include rent, telephones, light, heat, janitor service and other overhead for office space and equipment in excess of

what would be demanded after adoption of the measurement methods.

Training. This includes salary of instructors, cost of training materials, and office overhead, as well as any compensation to the employee during the course of training.

Spoilage. A faulty method of selection causes a large turnover among the working force and a percentage of the new employees are bound to be inefficient and shortly to be discharged. With inexperienced salesmen this frequently results in loss of sales and alienation of former customers; with new workers it results in spoilage, breakage or loss of material, or in damage claims.

Salaries of inefficient men. This item covers only the sums paid to employees hired under the less rigorous selection methods who would be rejected if measurement methods were used and who would, in any event, eventually be discharged or leave of their own accord.

Loss of prestige to the company. A more intangible effect of improper selection is loss of prestige through the fact that the company is judged by the type of men who represent it and the quality of manufactured products which it places on the market.

Effect of turnover on morale. Still less tangible is the effect of turnover on morale or esprit de corps. A large turnover unsettles a department and is a stimulus for men to leave who ordinarily would remain with the company.

Adoption of more efficient methods of selection reduces the cost of these items. It also enables the firm to use special incentives on those men who are most likely to succeed.

The experimenter should secure reliable data on as many of these items as is feasible, and make conservative estimates of those items where precise data are not to be had. In his report the importance of these items and the possibility of their reduction may be presented graphically as well as statistically. This report must distinguish clearly between economies which are certain and those which are only probable or of doubtful amount. Statements must avoid both ambiguity and exaggeration if they are to command respect.

I. INSTALLATION AND UPKEEP

To complete the study, the experimenter should see that the tests are properly installed and are continued in operation in their original form or with changes justified by experiment.

1. Installation. a. The examiner. It requires more training to conduct an experiment in vocational testing than to administer the tests. Economy of effort will result if the experimenter assigns the task of administering the tests to another. He should insist on the selection of a tester who is fairly intelligent, polite and tactful, favorably inclined toward the theory of tests and scientific method in general, and equipped with a good educational groundwork for the task. The examiner should receive detailed instruction in the use of the tests and also an outline of the research steps taken previous to their installation. He will probably have considerable time which may be profitably spent in carrying on additional statistical work necessary to the upkeep of the tests and their further evaluation. The

necessary knowledge will have to be imparted by the experimenter.

b. The forms. The tests should be used in selection exactly as evaluated. Forms will have to be devised for making the administration of the tests run as smoothly as possible. The most important form, of course, is the individual test record. This should have space for recording test scores and the significance of these scores as indications of future vocational performance. All of the applicant's test records should be kept on one sheet. Directions for giving the tests, scoring the tests, preparing scoring stencils, and using the forms, will also have to be provided in permanent form. If the tests are to be printed, they may be printed in booklet form for convenience of administration. A good practice is to print the test record form on a folder of letter size, in which all original test sheets may be filed.

c. The room. For group testing any large room may be used which is unoccupied certain hours of the day. For individual testing the office of the examiner may very well be used. Committee rooms will be found convenient for testing small groups. The provisions for testing will depend very much on the available office space of the firm. In general, the room should conform with the requirements set worth in Section E-1.

d. The procedure. The personal interview and the tests should supplement each other in employment procedure. It is a question which should precede. The best practice is probably to allow the applicant to see the interviewer first, who may then turn him over to the tester if the applicant possesses no outstanding characteristics rendering him unfit for the job. But the test score should be the deciding point. The function of the interviewer then becomes that of conserving the time of the tester by eliminating those applicants with gross defects, as well as making the first contact of the applicant with the firm a personal one. The intervewer should also be entrusted with the task of finally hiring or rejecting the applicant.

2. Upkeep. This has two aspects: first, the experimenter must assure himself that the tests are being used continuously in the manner outlined in his report; second, he must check them from time to time to ascertain if they are still efficient or if changing circumstances call for changes in critical scores, procedure, etc.

a. Continued use of the measuring instruments. The experimenter will have to assure himself from time to time that the tests are being used in accordance with the instructions in his report, and that no modifications are made which are not justified scientifically. The experimenter will also have to assure himself from time to time that the tests are being used at all, as there is a tendency among interviewers to revert to former methods of making off-hand judgments, or for testers to estimate the individual's response without completely carrying out the test procedure. There is always a desire for personal power in dealing with human beings, and if a close watch is not kept some people will try to usurp this power. The tests by their objectivity take away this personal power.

b. Modifications of procedure and standards. It is possible that changing conditions of employment will cause changes in the predictive accuracy of the tests, so that constant checks must be made on their efficiency. Thus, if incentives are used on those who pass the tests, assuming that they will be successful and that it is worth while trying to hold them with the firm, a different sort of person may be led to apply for positions. Some of those who failed under previous conditions might have succeeded if these incentives had been applied; therefore some of the men who fail technically in the tests may prove to be successful if hired under improved job conditions. This calls for the general warning that if maximum value is to be attached to test scores the conditions under which the applicants are employed with the use of tests should reproduce in general the conditions under which they were employed when the tests were evaluated.

As the type of applicant improves or declines the test standards will have to shift. Standards will also have to shift in accordance with the demand for men and the available supply Variations in incentives due to changing economic pressure may invalidate some test results. Again, if men pass the tests and at a later date leave the company or are discharged, the reasons for leaving should be examined critically to see if the test prediction was really at fault. The experimenter must beware of general knowledge of the tests on the part of new applicants and provide alternative forms to guard against coaching. He should keep a continual watch on the tests, and after making due allowances for their margin of reliability, check up the circumstances under which they make faulty predictions and apply the proper remedies and changes.

The maintenance of test procedures and other measurement in vocational selection clearly demands the oversight of a careful, statistically trained and judicious minded person. It is no duty for the casual amateur, the fadist, or the purely routine executive, any more than is the devising, standardizing and evaluating of the methods in the first place.

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